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GARBAGE COLLECTION AND INCINERATION AT NORFOLK, VA.

Force of Men and Teams Employed—Cost of Collection per Cart and per Cubic Yard—Methods of Disposal—Description of New Single-Unit and Double-Unit Incinerators.

BY WILLIAM R. RUSSELL.*

Norfolk is a large shipping and distributing center for all kinds of truck grown in southeast Virginia and the northeastern portion of North Carolina, and fish from fisheries of Chesapeake bay, Albemarle and Pamlico sounds, and much of the truck and fish find storage and sale in this city. A certain percentage eventually reaches the crematory for destruction, making the amount of garbage collected considerably larger than in the average city of this size and of a kind which is most difficult to burn. The city has a population of 90,000 and covers a considerable area, and, like most Southern cities, the houses are built detached with large yards.

We have thirteen garbage sections, and these are subdivided between thirty-four collectors, who start at seven in the morning and, while the working day is nine hours, they are required to clean their routes before stopping work in the evening. During July and August the amount of garbage is especially large (as we have the colored brother with us and his love for watermelons materially increases the output of rinds), and the men work overtime; but other months of the year they often finish their routes between 3 and 5 o'clock and are permitted to put up their teams and go home. During the months of June, July and August the garbage is heaviest, and because of the excessive amount of moisture, overtaxes the capacity of our plant. Melon rinds and vegetable refuse from the kitchen that cannot be incinerated are each day spread on a lot in the rear of the incinerator, and when the collectors have finished, this is covered with waste paper and the paper set afire, which dries out the garbage considerably. The next morning this garbage is covered with 6 inches of street sweepings, which keeps down all odor, and the sweepings are leveled and the trash taken out to prevent an unsightly appearance. The next year this compost is sold for manure. Data as to the revenue derived from this material are being prepared, but are not available at this time. There are four other sections of the city where this method of disposing of kitchen refuse is used because of the long haul to the crematory, and it has been found sanitary and economical. Furthermore, as the dumps in these sections are in marshes, the method adopted serves a double purpose—the city gets rid of an unsightly marsh and effects an economy in handling the garbage.

We have a force of 34 men, 35 horses, 31 carts and 2 steel body wagons, one of the latter having a capacity of three cubic yards and the other a capacity of four cubic yards. The carts carry a fraction over $1\frac{1}{2}$ cubic yards. We have recently purchased three Tiffin steel-body garbage carts and find them so much superior to

the usual wooden-body cart that it is the purpose of the city to equip all garbage routes with them. They are easy on the horse, measure 4 ft. 7 ins. from top of cart to the ground, and can be tilted back when beginning to load so that the packages to be dumped into the cart require to be lifted only 18 inches, and when loaded or partly loaded the cart can be dumped with the greatest ease. The carts are round-bottom and pivoted on the axle; they have a capacity of $1\frac{3}{4}$ cubic yards each.

Garbage, ashes and all kinds of refuse are collected from the entire city every day except Sunday, and on Sunday mornings we have a "sniper" gang (two broom men and two carts, the drivers of which also carry brooms) that covers the business section and some of the principal streets, gathering up waste paper, run gutters and pick up any boxes or receptacles left on sidewalks or in lanes.

The incinerator above referred to is situated in the old part of the city, and receives garbage from the section known as the "Four Old Wards." The average haul from any portion of this territory to the plant is one mile, and each driver averages 6 $\frac{1}{12}$ loads per day ($1\frac{1}{2}$ cubic yards per load). The produce brokers, commission merchants and fish packers haul their own refuse to the incinerator; consequently, the tonnage destroyed there shows larger than that hauled by the city carts. The four old wards are divided into eight garbage districts. Districts 1, 2 and 3 have seven drivers and one helper, five carts and two double wagons, this being necessary because these districts contain the business houses and hotels. The extra helper is used on the 4-yard wagon. Districts 4 and 6 have three carts, being a residential section, and the refuse unusually light. Districts 5 and 7 have two carts each, and No. 8 has one cart, this cart having only the market and the streets around the market to look after.

The city requires a separation of garbage and combustible material from the non-combustible material, and that the packages be placed at the curb line in front of the premises before nine o'clock in the morning. Soon as the cans are emptied the driver places them at the building line and the occupant of the premises must take them in at once.

Because of the rapid growth of the city and the rapidly decreasing space for dumping ground, other means will have to be adopted in the near future for the disposal of its refuse—either centrally located stations with motor trucks to haul the material from them to outlying territory, where it can be disposed of, or barges for taking it to sea and dumping there.

The accompanying statement gives the cubic yards,

*Superintendent of Street Cleaning, Norfolk, Va.

tons and loads of garbage hauled and incinerated in the four old wards of the city. These amounts represent the work of eight drivers and one helper in the eight garbage districts in this territory. The garbage men receive \$2.10 per day of nine hours, and all the city employees are given fifteen days' vacation with pay after ten months' continuous employment in the calendar year.

GARBAGE COLLECTED FROM THE FOUR OLD WARDS AND INCINERATED DURING THE SIX MONTHS, JULY 1ST TO DECEMBER 31ST, 1914.

Mo.	No. days month	Cu. yds. for month	Tons per day	Cu. yds. per day	Loads per day	Loads per day, each cart	Total tons
July	27	2,368	29 2/9	87 2/3	58	7 1/4	789
Aug.	26	2,432 1/2	31 3/16	93 5/8	62 1/3	7 3/4	810 5/6
Sept.	26	1,941 1/2	24 8/9	74 2/3	49 7/9	6 1/8	647 1/9
Oct.	27	1,984	24 1/2	73 2/3	49	6 1/8	661 1/2
Nov.	25	1,578	21 1/24	63 1/8	42	5 1/4	526
Dec.	27	1,294 1/2	16	48	32	4	432
Totals	158	11,598 1/2					3,866 1/2
Average for six months		1,933	27 7/9	73 3/4	47 1/16	6 1/12	644 5/12
Cost per day of maintenance, cart, horse and harness							.68
Driver at \$2.10 per day							2.10

Total 2.78

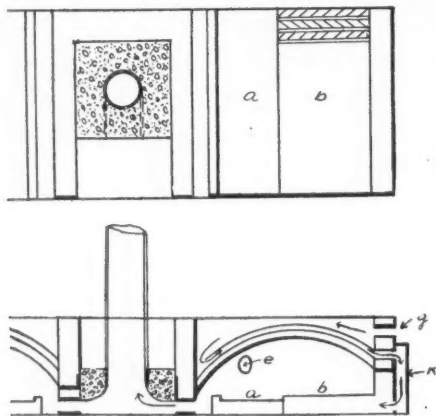
Average number of loads per day for one driver.... 6 1/12

Cost of hauling per unit of 1 1/2 cubic yards..... 45 3/4c.

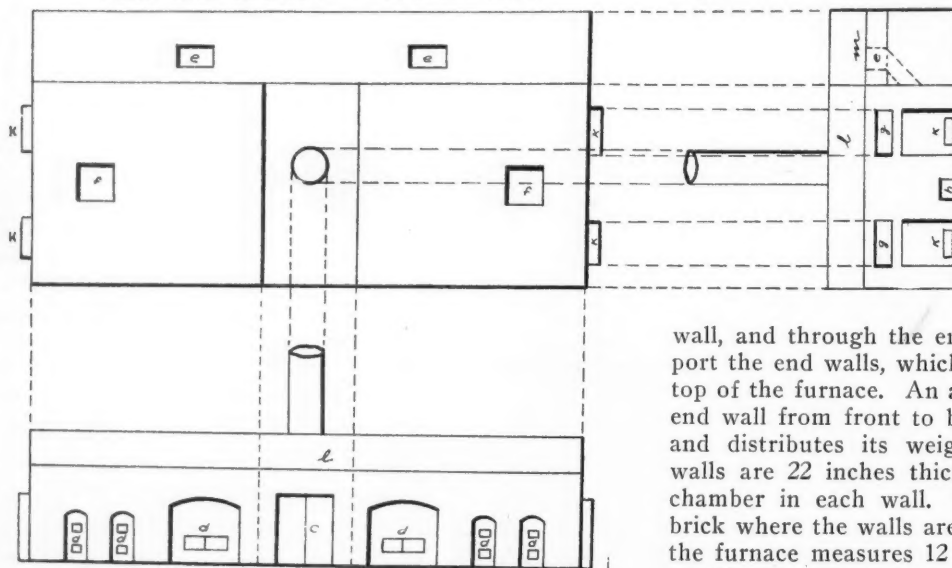
Garbage will average three cubic yards to the ton, making the cost of hauling 91 1/2 cents per ton, and this added to the cost of incineration makes \$1.26 1/2 cost per ton for collecting, hauling and incineration.

NORFOLK'S NEW INCINERATOR.

In the summer of 1913 Norfolk found that it required a new incinerator, and the matter was brought to the at-



PLAN AND SECTION OF DOUBLE UNIT.



ROOF PLAN, FRONT AND END ELEVATION OF DOUBLE UNIT.

a—Garbage pan. b—Grate. c—Tool house. dd—Stoke holes. ee—Garbage chutes. ff—Trash chutes. gg—Draft holes. h—Ash door. kk—Draft boxes. l—Steel waist. m—Wooden deck.

tention of the Board of Control. The writer, as a member of the board having charge of the street department, began an inquiry concerning the merits of different plants available for this purpose, with the idea of procuring one combining simplicity and durability and of sufficient capacity for the city's needs at the smallest possible cost for installation and operating expense. Plans, specifications and proposals for installing such a plant were asked for by advertising and four companies responded, among them the Nye Garbage Crematory Company, whose proposition was finally accepted.

With his previous experience in handling incinerating plants (one of which was the old Morse type, built about 1879 or 1880, which, it should be stated, was a good plant in its day, being simple in construction and having lasting qualities), the superintendent of the department was impressed with the simplicity of the Nye plant. The company claimed that this plant would completely incinerate all material without odor, and suggested that a representative of the city be sent to Raleigh, N. C., where it had just completed a plant, to verify the claims made by the company as to its being odorless in operation, as to its capacity and its small operating cost. This was done, and after seeing the Raleigh plant in operation, it was believed that such a plant would suit the needs of Norfolk, with a few minor alterations, which were considered necessary because of the great difference between the character of refuse at Raleigh and that to be incinerated at Norfolk. A report to this effect was made to the Board of Control, which requested the Nye company to send their engineer to Norfolk to obtain first-hand information as to the character of the garbage and other matters. After going over the situation, the company's engineer decided that a two-unit plant could be installed with the alterations recommended that would handle all the material to be incinerated, and that the alterations suggested would not decrease or affect the efficiency of the plant.

After further consideration, the city engineer and superintendent of street cleaning finally recommended to the Board of Control that this company be awarded the contract for a single-unit with a capacity of six to ten tons in twelve hours for Berkley ward at a cost of \$4,500, including the house over the plant; and for a double unit for the four old wards, which should have a capacity of eight to twelve tons in twelve hours and cost \$8,000, not including the house; and a contract to this effect was awarded and the plants constructed.

The single unit is 16 feet by 20 feet outside measurement, built of brick. There are four cast-iron strong-backs on each end, full height of walls; one-inch iron rods run from end to end of plant at top and bottom of wall, and through the ends of the strong-backs, to support the end walls, which carry the thrust of the arched top of the furnace. An angle iron set horizontal in each end wall from front to back forms the seat of the arch and distributes its weight on the strong-backs. The walls are 22 inches thick, eight feet high, with an air chamber in each wall. The furnace is lined with fire brick where the walls are exposed to fire. The inside of the furnace measures 12 feet by 12 feet, with an arched top 22 inches thick lined with cupola fire brick and turned on a radius of 8 ft. 8 inches.

The plant is a combination of a combustion chamber, a dry-kiln, a baker's oven and a furnace. Half of the

furnace—6 feet by 12 feet (72 square feet)—is in grate surface, at either end of which a fire is built with trash and waste paper from the garbage collection. The other half of the furnace is occupied by a car which is described elsewhere in this article. The fires at each end of the combustion chamber dry the light garbage and trash, the flames and heat rise and follow the line of the arched top, going over the heavy garbage and dead animals on the other side of chamber and bake this mass dry, finally incinerating it by refracted heat. The household garbage collected is fed through a chute at the top of the grate bars, falling between the fires, and as it dries is pulled over on the fires and furnishes the fuel for incinerating, no other fuel being required.

The heavy garbage and dead animals are loaded on the above-mentioned car and rolled into the furnace. The top of this car is a steel pan lined with fire brick, the top of which is on a level with the top of the grate bars. This prevents this heavy garbage from blanketing the fire and makes it possible to keep the fires bright and hot, and the refracted heat from the arch and the flames passing over this garbage rapidly and completely incinerate it. The opening into the stack is below the top of this car, and because of this construction and of the arched top of the furnace, there is caused a circulation of heat through the smoke by which all gases and odors are eliminated before the smoke passes into the stack. In fact, when the furnaces become thoroughly heated the amount of smoke discharged is hardly perceptible, only a heated vapor being discernible coming from stack.

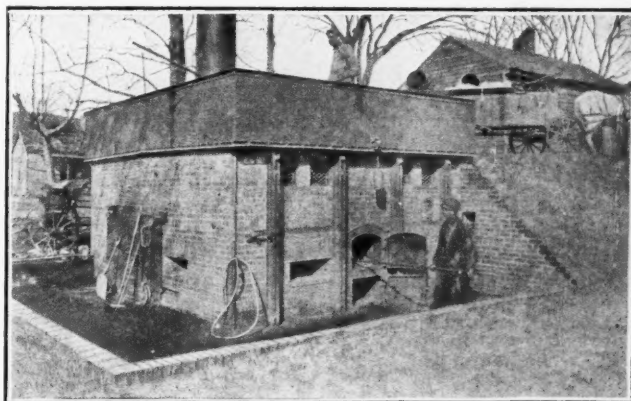
The air drawn into the furnace for combustion is taken in through openings in one end at top of plant, passes between the steel deck and a corrugated iron arch, then back between this iron arch and the furnace arch, and then down a shaft and under the grate bars into the furnace, thus being pre-heated. The stack is of steel, forty feet high and lined with four-inch fire brick specially designed to give an air chamber between the metal stack and lining, thus preventing the metal from becoming unduly heated and burning out.

When this unit was tested before being accepted by the city, it incinerated an average of fifteen tons of average-run garbage from Berkley ward in twelve hours, and has continued to do so. This garbage is exclusively such as is gathered from residences, consisting of trash, waste paper and kitchen refuse. (The plant has a chute for night soil, but the city of Norfolk is sewered and, therefore, this feature is not used.) The cost for labor at this plant is four dollars per day—two men at \$2.00 each—making the cost of burning this garbage 26 2-3 cents per ton. The garbage is completely incinerated, leaving about five per cent ashes.

The double unit plant resembles in outside appearance two single units placed side by side, but differences in the nature of the garbage collected from the old four wards of the city necessitated certain alterations in the arrangement of the furnace and method of charging same with garbage. As this plant receives large quantities of decayed vegetables, fish and fish offal from two fish markets, dead animals, and various kinds of foods condemned by food inspectors, the car was considered impracticable. The general plan of the single unit was followed with these exceptions: The car was eliminated, and instead the steel garbage pan was set in concrete on a level with the grate bars, and a garbage chute 18 inches by 30 inches was arranged to enter the back end of the furnace from above through the wall, where the chute for night soil was placed in the other plant. A stoke door was built in wall at bottom of chute to permit spreading the garbage over the pan and breaking it up with a slice bar (i.e., turning it over) during the process of incineration.

A winch at the back of the plant is used for pulling large dead animals in to the garbage pan by means of a chain run through the stoke door to the large door in front of plant when required.

The furnace measurement of each unit of the double plant is 14 feet by 14 feet. The arch is turned on a 9-ft. 10½-in. radius. The grate surface is 8 feet by 14 feet (112 square feet), and with this increased grate surface we are able to burn in each unit 8 to 12 tons in 12 hours, even though the garbage is of the kind most difficult to burn. Four men are required to run these two units at \$2.10 each, a total cost for labor of \$8.40 per day, making the cost for incineration 35 to 53 cents per ton. A 1,600-lb. horse was placed in one of these furnaces recently after the plant had been shut down for three days. Household garbage (trash, kitchen refuse and waste paper) was placed on the grate bars through the chute and the fires started, and in three hours incineration was complete and without odor. This plant has a 50-ft. stack for both units; but one unit can be used and the other shut down when necessary or desirable.



SINGLE UNIT NYE INCINERATOR.

The reason for eliminating the car, which was used in the single unit, was that the quantity and character of the garbage to be incinerated at this plant would require the frequent opening of the large door in the front of the combustion chamber for the purpose of reloading the car, thus admitting a large quantity of cold air and reducing the temperature of the furnace considerably. With the construction adopted, the wagons can dump their loads on the deck at the mouth of the chute, and the garbage is fed into the furnace at any rate desired, and thus the temperature is maintained. With the car, the wagons would have to dump in front of the furnace on the ground, and the garbage remain there until each car load was burned off, thereby creating a nuisance.

The heavy garbage does not come in contact with the side walls, but lies in a pile, so that the heat reaches it on all sides and rapidly incinerates it. There are no obnoxious odors from either furnace or smokestack while in operation, and it is, therefore, believed practicable to distribute a number of units throughout the city in order to decrease the haul, as additional units may be demanded from time to time.

FIRE PREVENTION PRIZE ESSAYS.

Prizes are being offered for essays on the subject of "Fire Prevention" by the National Municipal League, through the generosity of certain friends of that organization. These prizes of \$30 and \$20 respectively are offered for the two best essays written by pupils of high schools in any part of the United States. Further details may be obtained by addressing Clinton Rogers Woodruff, secretary of the League, North American Building, Phil-

adelphia. The object of this is "to direct attention of the contestants to the actual administration of a municipal function, and to elicit an expression of opinion as to the way that function is discharged or should be discharged."

REFUSE DISPOSAL AT SAVANNAH

Character of Southern Refuse—Comparison of Disposal Methods—Description of Destructor Recently Built—Result of Test.

The character of waste collected in southern cities differs materially from that of cities in colder climates. The garbage of the south contains a very much larger percentage of vegetable matter and far less meat. It also contains much more combustible rubbish, since a considerable portion of this is used in the north for kindling fires and for fuel, and only 20 per cent of the total refuse there consists of this material, while in southern cities it constitutes 45 to 50 per cent of the total refuse. For a similar reason, while ashes constitute 70 to 80 per cent of the total refuse collected in northern cities, in the south it varies from 6 to 20 per cent. A peculiarly difficult character of garbage is found in the south also, an illustration of this being that in Savannah, during July and August of 1914, an average of twenty tons of watermelon rinds was collected daily, this being about 20 per cent of the total weight of garbage and refuse.

The result of the smaller amount of meat consumption in the south is a less percentage of grease to be found in the garbage, one of the results of which is that utilization methods are not likely to prove profitable in connection with southern garbage. Another difficulty in employing utilization in the south is that it appears to be impracticable to compel the colored household servants of that section of the country to separate the kitchen garbage from the other refuse. Still another argument in favor of incineration is the larger amount of combustible rubbish which has to be disposed of under southern conditions, and the more attractive possibilities in the way of creating heat.

It has been found that burning a mixture of garbage, rubbish and ashes without any additional fuel will evaporate from 1.3 to two pounds of water from and at 212 degrees for each pound of refuse burned.

In some cities of the north a large part of the garbage is fed to swine, and while this may be practical there, the difficulty of separate collection of garbage and also the greater liability for it to decompose and sour rapidly in the warmer climate makes this method of disposal objectionable in the south.

For the above reasons it was decided to adopt incineration for disposing of the refuse of Savannah, Ga. The city has a population of about 80,000, practically one-half of which is colored, and occupies approximately seven and a half square miles. The streets are laid out on a rectangular plan, with a complete system of alleys which are utilized in removing wastes. It is comparatively flat and contains about forty-five miles of paved streets and alleys.

Under present operating conditions, rubbish and kitchen garbage can be placed in one receptacle, but the ashes must be placed in a separate receptacle. From about 80 per cent of the populated section of the city the garbage and rubbish is collected daily and from the remainder every other day, with the exception of extreme outlying districts, which receive bi-weekly collections. The amount of garbage collected is approximately one

pound per inhabitant per day. The cost of collecting and delivering this to the destructor plant is \$2.29 per ton, this including the maintenance of the teams and stock, the feed of the stock, labor and new stock purchased during the year. The collection of ashes is comparatively unimportant, since the collection varies from three to eight tons a day in winter, and in summer is negligible. The ashes are used for filling depressions in streets. Cinders are collected from manufacturing plants to a certain extent to mix with the garbage during the months of July and August, the height of the melon season, to increase the amount of combustible matter in burning the same. Aside from this, plants are required to dispose of their own cinders. These cinders are found to contain from 15 to 20 per cent of fuel, and they assist in forming a more vitreous clinker, which increases its value for serving as road foundation or concrete material.

Dead animals are delivered to a rendering plant operated by a private party, from whom the city receives a revenue. Revenue is also obtained by the sale of street sweepings and the sweepings from the city stables.

Dirt from catch basins is taken to low ground outside the populated section of the city where there is no objection to dumping it.

The city furnishes large wooden boxes to stores, restaurants, hotels and theatres in which to place paper, excelsior and light material for final removal.

In order to destroy this garbage and refuse, the city contracted with the Destructor Company for a high temperature destructor of the Heenan-Froude type, which was completed on March 23, 1914, and has been in continuous operation since then—a length of time thought to be sufficient to thoroughly test its efficiency. E. R. Conant, the city engineer, recommended to the city a plant which would generate as much steam as possible from the burning refuse, with the idea of locating the plant adjacent to the municipal water works pumping station and using the steam for operating the pumps. This was done, and the destructor plant is but 60 feet from the walls of the pumping station, and steam is conveyed direct through a pipe from the destructor to the steam header in the boiler room of the pumping plant.

The destructor plant consists of two furnaces, each having a capacity of 65 tons and consisting of four cells about 28 inches wide on the bottom, 34 inches wide at the top, 16 inches deep and 8 feet long. Each unit has a separate large combustion chamber, a 200 h.p. Wickes water tube boiler, and an air heater and centrifugal fan for supplying forced draft. The cells are fitted with trough gates, a comparatively recent development here, but one used quite extensively in plants of this kind in England. Adjacent to the furnaces is a receiving pit with a capacity of 260 cubic yards, into which the refuse is dumped; a regenerator or pre-heater; electric hoist for lifting the material from the storage pit and transferring it to the containers; also necessary instruments for measuring and recording conditions of the furnaces, and a steam turbo generator of 75 k.w. for supplying the current for lighting the plant and operating the motor. Each grate has a burning area of 20 square feet and each boiler a heating surface of 2,000 square feet with a working pressure of 160 pounds per square inch. The stack, of radial brick construction, is 6½ feet inside diameter at the top and 150 feet high. A Foster superheater superheats the steam generated by the boiler. The supply of air for the forced draft is taken from the ventilating system in the building.

The receiving pit is 32 feet long, 20 feet wide and 11 feet deep, the greatest length being parallel with the beam which carries the hoisting grab bucket, by which

*Abstract of paper before the American Public Health Association by E. R. Conant, city engineer of Savannah, Ga.

construction the bucket can reach any material in the pit by a direct drop without extra handling in the pit. The bucket also can pick up any portion of the refuse and distribute it over the surface of the remainder to secure a better mixture.

The containers into which the material is deposited by the grab bucket are located one over each cell of the furnaces and each with a capacity of about one cubic yard. These containers are closed by horizontal sliding doors constructed in two parts. The space above the grate is common to all the cells and to the combustion chamber, so that there is free interchange of heat between the cells. The main grates on which the combustion takes place are of heavy cast iron construction, perforated with a number of holes to give distribution of air throughout the refuse, and also secure a maximum cooling effect on the grate bars.

It was guaranteed that this plant would destroy 130 tons of refuse in twenty-four hours without additional fuel under normal operation, and that no odors or obnoxious gases would escape from the chimney or building. That at no time during the normal operation of the plant would the temperature fall below 1,250°F, and that it would be maintained at an average of 1,500°F in the combustion chamber. That one pound of refuse would generate at least 1.3 pounds of steam from and at 212°F. That the net effective boiler capacity over and above that required for operating the plant would be 330 h.p., based on 34.5 pounds of steam per boiler h.p. That the cost of incineration would not exceed 40.4 cents per ton, based on a stated schedule of wages, and that at least 68 pounds of refuse could be burned per hour per square foot of grate area. The total cost of the plant, including all extras and the steam connection with the pumping station, was \$126,271.

In actual operation, all refuse brought to the plant is weighed and then dumped into the storage pit, from which it is lifted by the grab bucket operated by an electric transporter and deposited in one of the containers. The bottom doors of the containers are operated hydraulically from the stoking floor. Stoking is done through a small supplementary door in that which closes the opening through which the clinker is withdrawn. The sides of the grate diverge slightly from the rear to the stoking door, and for removing the clinker there is a large bar to which is fastened a plate which forms an upturned hoe. This upturned hoe is laid on the bottom of the grate before the first charge is dropped upon it, and the clinker is pulled out by drawing this hoe forward by power obtained from a hydraulically driven winch. A hand-drawn clinker car has previously been drawn alongside the opening and receives the clinker. From three to four minutes are required for removing the clinker from the grate. While withdrawing the clinker, regulating valves are operated so as to shut off the forced draft air supply.

Mr. Conant believes that the deep fires which can be maintained in these furnaces enable the wet portion of the refuse to be more thoroughly dried and destroyed than do shallow ones, and that this is one of the reasons for the success of the plant.

The average time of burning a charge is twenty minutes. Each grate is ordinarily clinkered after each sixth charge. When the plant is working at full or nearly full capacity the labor is operated in three eight-hour shifts. With only from 60 to 75 tons of garbage to be destroyed, one unit is used with three shifts of labor, which is considered better than both units using two shifts, as it gives a more even supply of steam to the pumping station.

Mr. Conant figures that from the beginning of the operation of the plant, March 24, to the middle of December, \$4,500 had been saved in fuel at the water works

plant by the use of steam from the incinerator, and that when the refuse burned reaches the capacity of the plant, an annual saving in this way of \$12,000 will be made.

The total amount of refuse consumed from March 24 to November 30 was 18,700 tons, an average of 68 tons daily. The total cost of operating the plant was \$10,900, or 60.2 cents per ton. If allowance is made for the fuel saved at the pumping station, the net cost is reduced to 36 cents per ton.

The percentage of clinkers obtained varies from 20 to 30 per cent of the total refuse burned, the larger amount being secured during July and August and the smaller during the season when the refuse is dry. The clinker is being used for road building and raising low lots, for which purpose it is estimated to have a value equal to the cost of removing it from the plant.

The labor for each shift, with the plant working at full capacity, requires one man to feed the hoppers, four stokers, one engineer, one crane man; which gives a total cost per shift of \$17.50, or \$52.50 for the three shifts. As only about 68 tons is burned daily, except in the melon season, the cost of labor is only about \$44 per day of three shifts.

The guarantee of the contract was based upon the refuse containing the following percentage of materials: 45 per cent garbage, 40 per cent rubbish, 10 per cent ash or cinder, 5 per cent manure by weight; the garbage to consist of organic material, vegetable and animal, with water and grease; rubbish to consist of paper, rags, excelsior, straw, glass, etc. The plant was operated for five months before it was accepted by the city and final payment made to the contractors, in order that its operation could be watched and to observe if any weakness might develop requiring changes. Three tests were made under conditions that would enable the city to ascertain whether the plant could work to its guaranteed capacity and fulfil all the contract requirements. At the final test the plant exceeded the requirements and has worked efficiently during the period that it has been in operation. No obnoxious odors come from the stack or building. Under normal operation the temperature in the combustion chamber averages about 1,700 to 1,800 degrees, and at times it is necessary to wet the refuse before it is taken to the furnace to keep the temperature below 2,000 or 2,200 degrees, since a higher temperature might endanger the lining of the combustion chamber. The water evaporation exceeds by about two-tenths of a pound the guaranteed evaporation of 1.3 pounds.

Mr. Conant in his paper gives the log of the test made on August 21 and 22, from 3 a. m. on the former day to 12:30 on the latter—21½ hours. During this time 12,909 pounds of refuse were burned per hour, or 80.6 pounds per square foot of grate surface per hour. (Guarantee was 60 pounds.) The total clinker and ash produced was about 68,600 pounds, or 24.7 per cent of the refuse burned. The temperature of the combustion chamber varied from 1,700 to 2,000 degrees, averaging 1,854. The steam pressure averaged 120 pounds with a temperature of 523 degrees and a superheat of 173 degrees. The average temperature of the feed water was 206 degrees. The total amount of water evaporated from and at 212 degrees was 450,382 pounds, or 1.62 pounds per pound of refuse burned. (Guaranteed evaporation 1.3 pounds.) The total horse-power developed was 607, and the estimated amount used in the plant for the turbo-generator and the boiler feed pump was 118 h.p., leaving an excess of 489. (Guaranteed excess, 330 h.p.) The average air pressure under the grate was 3¼ inches, and the average temperature 252 degrees. The average stack draft was 0.72 inch. A total of 447 charges to both furnaces were made and clinker drawn sixty-four times, or about one clinkering to seven charges.

According to the contract, the price for labor was to be estimated as follows: Hoisting and stoking, \$2.40 a day; clinker removing, \$1.50 a day; engineer, \$4. As a matter of fact, the wages paid were \$2.25 for hoisting, \$1.75 for stoking, and the same for clinkering and engineering as estimated. On the basis of the former prices, the labor charges per ton were 40.4 cents, but on the basis of the actual wages paid and the total amount actually burned, the cost of operation was 31.8 cents per ton.

The test was made with a running start. All the hoppers were empty and were then charged with the test mixture; and the hoppers were empty again on the completion of the test. Combustion chamber temperatures were taken with a thermo-electric recording pyrometer. Water was measured with a Worthington hot water meter. Steam pressures were taken with a recording pressure gauge connected with the main steam line. At 7 a. m. on the second day all the refuse in the storage pit had been burned, and from then until 8 o'clock insufficient refuse was delivered to keep the plant going at capacity.

PAVEMENT COST DETAILS

Explanation of Cost Figures Given in Tables II and III of the February 4th Issue.

The following items were crowded out of last week's issue, as explained on page 135. They should be read in connection with the tables in that issue.

Schenectady, N. Y., laid 63,000 square yards of stone filled sheet asphalt 2 inches thick and without binder, the cost being \$1.50 per square yard, including base. The concrete base for brick pavement cost 72 cents per square yard.

Solvay, N. Y.—Sandstone curbs cost 85 cents per lineal foot, this including excavation and drain tile. Drain tile was also used under the concrete curb and gutter.

Utica, N. Y.—The price of combined curb and gutter is given as 47 cents, the curb being 5 inches wide and the gutter 12 inches; this price being "based upon gutter being counted as a square foot of pavement."

Asheville, N. C.—The price of \$1.34 per square yard for concrete sidewalks includes considerable grading. Without this, the cost was \$1.10.

Barberton, Ohio.—Grading cost 30 cents per cubic yard, not included in price given.

Cambridge, Ohio.—The price given includes excavation and also inspection, engineering, advertising, legal and part of storm sewers.

Cincinnati, Ohio.—All the first grade pavements are laid on 6-inch concrete base costing an average of \$5.50 a cubic yard.

Cleveland, Ohio.—Six-inch concrete foundation costs 81 cents per square yard, which is not included in the price given for stone block or brick.

Elyria, Ohio.—Excavation costs 40 to 60 cents per cubic yard; 5-inch concrete cost 60 cents to 65 cents per square yard.

Ironton, Ohio.—The price includes curb and gutter and sewer pipe drainage. Sidewalks are usually 6 feet wide, with 3 inches of concrete and 1 inch of finish; contract price for same is 8 to 9 cents, which inspection and incidental expenses increase to 10 cents.

Lakewood, Ohio.—Bituminous concrete is used for repairs to old sheet asphalt. The curbing used is split stone hand dressed 5 x 20 inches. The sidewalks are sawed stone 2½ inches thick, laid on 4 inches of cinders. The price per square yard includes 6½ inches of excavation.

Marion, Ohio.—Sandstone is used for both sidewalks and curbs, the former 2½ inches thick by 4 feet wide, the latter 5 inches by 18 inches in 5-foot lengths.

Portsmouth, Ohio.—The price includes grading, curb and gutter, drain tile, sewers, manholes, catch basins etc.

Sidney, Ohio.—Prices include grading, house sewers and connections. Sidewalks are 4 feet wide and cost 10 cents a square foot.

Bethlehem, Pa.—Five-inch concrete base mixed 1:2½:5 cost 50 cents a square yard. Extra excavation, 60 cents a cubic yard.

Charleroi, Pa.—Concrete curbs are molded in the shop with a steel protection on the edge, being made 5 in. by 24 in. by 5 ft. long.

Connellsville, Pa.—Brick are laid on a cinder base 8 inches thick with 2-inch sand cushion at a cost of \$1.35.

Greenville, Pa.—Five-inch concrete base mixed 1:3:6 cost 58 cents a square yard. Grading cost 40 cents a cubic yard. Combined curb and gutter, curb 6 inches wide, 6 inches face; gutter 18 inches wide, 6 inches thick; cost 49 cents for straight curb, 69 cents for curved. Concrete sidewalk 5 inches thick cost 12 cents a square foot.

Wilkes-Barre, Pa.—Extra excavation 50 cents a cubic yard.

Providence, R. I.—Bituminous macadam pavements are laid in streets already built of macadam on a foundation averaging 5 inches thick composed of material found in the street, with some added if necessary.

Columbia, S. C.—Concrete sidewalks and curbs are mixed 1:2:4.

Abilene, Tex.—The city engineer, H. J. Bradshaw, believes their price of 74 cents for bituminous macadam is the lowest to be found in the United States. This includes grading and all labor and material for 6-inch asphalt macadam with 16 to 18 pounds of asphalt.

Austin, Tex.—The wood block paving was all done by the street railway and the prices are not available. Memphis, Tenn., also uses wood block along the railway strip.

Hillsboro, Tex.—In the case of brick streets, the city pays for all intersections and one-quarter of the remainder; but on all other streets it pays for the intersections only.

Ogden, Utah.—Of the sheet asphalt reported, three-quarters of a mile was wearing surface only, 2½ inches thick; the balance was 1½-inch binder and 1½-inch wearing surface. The cost of the concrete sidewalks includes grading from curb to property line, a distance of 22 feet.

Bristol, Va.—Combined curb and gutter consists of curb 6 inches thick with 7-inch face and gutter 15 inches wide.

Newport News, Va.—Work given as bituminous macadam includes 4 inches of crushed stone on the subgrade, rolled and then treated with 2.7 gallons of Tarvia X by penetration method; grading also being included. The combined curb and gutter consists of curb with 6-inch top and 4½-inch face, and gutter 18 inches wide, 7½ inches thick at the curb and 8½ inches at the inside edge.

Aberdeen, Wash.—The wood block pavement was placed along the street railway track by the company.

Bellingham, Wash.—Grading averages 30 cents per cubic yard.

North Yakima, Wash.—For bituminous concrete and plain macadam, rock is furnished to the contractor free by the county. Grading is not included in the prices given and costs 60 to 75 cents per cubic yard.

Tacoma, Wash.—Prices given include curbs, gutters, necessary grading and drainage.

Walla Walla, Wash.—The gravel bitulithic is constructed from creek gravel screened. The base is 2½ inches thick with 40 pounds of asphalt to a thousand pounds of rock, the stone varying from 1½ to 2½ inches. The top consists of stone less than 1½ inches, is 1½

inches thick and contains 83 pounds of asphalt per thousand pounds of rock.

Moundville, W. Va.—Excavation, not included in price, cost 30 to 35 cents per cubic yard.

Parkersburg, W. Va.—Price includes grading, new curb, etc.

Green Bay, Wis.—51,670 square yards of sheet asphalt 30 feet between curbs, 34,231 lineal feet of 18-inch gutters and 6-inch curbs, including grading and base of pavement, cost \$6.67 per lineal foot.

Kenosha, Wis.—Grading cost 40 cents per cubic yard, not included in price.

La Crosse, Wis.—Price includes grading, curbs and gutters and inspection.

Neenah, Wis.—Grading cost 30 cents per cubic yard, not included in price.

Oshkosh, Wis.—Concrete No. 1 consists of one 7-inch course, mixed 1:2:4, reinforced with $\frac{3}{8}$ -inch rods 2 feet between centers, covered with $\frac{1}{2}$ -inch bituminous top. Concrete No. 2 consists of 4 inches of 1:4:8 concrete, $\frac{1}{2}$ inch of sand and 5 inches of reinforced top mixed 1:2:4 covered with $\frac{1}{2}$ inch of bituminous surface. The bituminous concrete was laid on a 5-inch base mixed 1:3:6, the top consisting of 2 inches of Topeka mixture, squeegee coat.

West Allis, Wis.—Sidewalks are 5 feet and 6 feet wide and cost 10 to 11 cents a square foot.

London, Ont.—The sheet asphalt consisted of a 2-inch wearing surface and $\frac{1}{2}$ -inch binder on a $5\frac{1}{2}$ -inch concrete base, cost \$2.15. Where the base was 5 inches and the binder 1 inch, the price was \$2.36.

Vancouver, B. C.—The stone block reported is along the street railway strip.

STREET CLEANING IN NORRISTOWN

Detailed Information As to Methods and Costs—Daily Flushing Cheapest.

By S. CAMERON CORSON, Borough Engineer.

The business section of Norristown, Pa., is usually cleaned once a week during the open season (from April 1st to Thanksgiving day). It includes Main street, about 3,500 ft. long and 50 ft. wide between curbs, and 1,900 ft. of De Kalb street, 36 ft. between curbs; a total of 27,000 sq. yds. In addition, the force empties 18 street cans that are placed along the curb line for the deposit of waste paper. This waste paper is taken to the nearest dump and burned, which also is included in the labor account.

The surface of the above streets is composed of the following materials: On Main street, 15,000 sq. yds. of Belgian block, 3,600 sq. yds. of bitulithic, and 8,400 sq. yds. of vitrified brick. It is seen that over one-half of the total area is Belgian block, which is laid with pitch and pebble joints, each joint being a receptacle for dirt and dust. In the brick pavement also there are many joints that are open for considerable depth from long use, the pavement having been laid in 1898 and being still in good serviceable condition. The bitulithic is easily cleaned.

The cost of the cleaning of the 27,000 sq. yds. is as follows.

2 carts, each 5 hours, at 30 cents.....	\$3.00
4 men, each 5 hours, at 17½ cents.....	3.50
Sprinkler, 2 hours, at 50 cents.....	1.00
Sweeper, 4 hours, at 50 cents.....	2.00
	<hr/>
	\$9.50

An average of about 35 cents per thousand sq. yds.

The first two items, totaling \$6.50, cover the ordinary sweeping of this same area, emptying cans and removal of piles of street sweeping by carts, which is uniformly the same every week.

But the cheapest and best results obtained have been from daily flushing of this same area, which is done for about half the above cost, or \$3.00 for the use of a double team 6 hours, at 50 cents, there being no charge for the water used. (By an agreement between the borough of Norristown and the Norristown Insurance and Water Company, all water is furnished free for sanitary sewers, flushing inlets and storm sewers, water bound macadam, city hall and flushing paved streets.) I do not figure our street cleaning costs by the sq. yd. but by the block, which in Norristown averages 450 feet from center to centre of streets. Using this as a basis, we can flush about 20 blocks in a day of ten hours at a cost of \$5.00 for the horses. The Highway Department owns the flusher.

All of the above mentioned paved streets are reasonably free from grit when the flusher starts.

It is my opinion that the only sanitary method of street cleaning is by flushing, as all the finer particles of dust and street accumulations are flushed into the gutters, where they are either carried into the inlets or deposited in the gutters where they may be broomed into piles and removed. Our experience has been that one could hardly get a full cartload of deposit from the 20 blocks, so thoroughly is the flushing done.

I have been asked whether we add the cost of cleaning the inlets to the cost of flushing and can answer that question thus: By the construction of 95 per cent of our storm sewer inlets and the traps used in each, syphonic action takes place as soon as the head of water is sufficient to overcome the water seal. The bottom of the inlet is curved into the entrance to the trap and upon the inrush of the street water what little grit, street droppings, etc., come into the inlet from the flushing will be carried along and pass off through the trap and lateral into the main sewer, leaving little or no deposit in the bottom of the inlet; consequently we have no additional cost. The foregoing information is based on figures kept by me for 1912 and 1913.

SHINGLE ROOFS AND FIRE LIMITS.

By W. B. CONANT.

A committee of five city officials and fire experts named by Fire Prevention Commissioner O'Keefe of the Metropolitan Fire District (which comprises Boston, Cambridge, Brookline, Arlington, Belmont, Chelsea, Everett, Lynn, Malden, Melrose, Milton, Newton, Quincy, Revere, Saugus, Somerville, Waltham, Watertown, Winchester, Winthrop and Woburn, a radius of about ten miles) has rendered its report on the subject of the advisability of ordinances forbidding the further use of shingles for roof coverings. The committee recommends the passing by every city and town in the district of an ordinance as follows:

The roof of every building erected or re-covered in whole or in part, and the top of every dormer window thereon, shall be covered and roofed with brick, tile, slate, tin, copper or iron or any other incombustible or fire-retarding roofing, as the commissioner by his certificate in writing may authorize; but this section shall not be construed to prohibit the patching or minor repairs of shingled roofs.

At a hearing held in October, when the above committee was named by the fire prevention commissioner, the latter pointed out the danger of another fire in any of several localities similar to that which swept away a large portion of Salem. Representatives of roofing material concerns who had been notified were present and presented figures to show the comparative costs of fire-proof roof coverings, as well as a representative of a lumber company, who presented the figures for shingle construction. Asbestos fireproof shingle, which is made of cement and fibre combined, was said to be no heavier than wood when water-soaked, and to be of great dur-

ability. Received from the manufacturer green, it hardens on the roof after being laid. Its cost for ordinary dwellings was given as between \$10 and \$12 per 100 square feet, laid.

Representatives of asphalt shingles stated that this type consisted of two and three-ply felt coated with asphalt. It sells at \$5.75 per square (100 sq. ft.) and costs \$2.00 per square to lay.

Amatite roofing was described as being of good fire-resisting qualities, though of less than a gravel roof.

Representatives of a rubberoid roofing reported roofs of this material more than 20 years old. Tests indicated good fire-resisting qualities. The cost is \$1.50 to \$2.40 per square, unlaied.

It was pointed out that gravel covered roofs lose their virtue by the gravel becoming loosened from the binder.

Representatives of a slate company gave figures to show the cost of slate, laid by various contractors in New England cities. The average cost in cities of Eastern Massachusetts is from \$9 to \$12 per square for sea green slate; up to \$13 to \$15 for unfading black, with several grades between at intermediate costs. The life of slate was given as 100 years. Galvanized nails last 25 years, the speaker said. It was stated that slate weighs 650 to 700 lbs. per square.

Lumber dealers present believed that there should be fire limits in which shingle should be forbidden, but agreed that the prohibition ought not to apply to the whole district. The claim was made that all the large conflagrations had started in building not having wood-covered roofs.

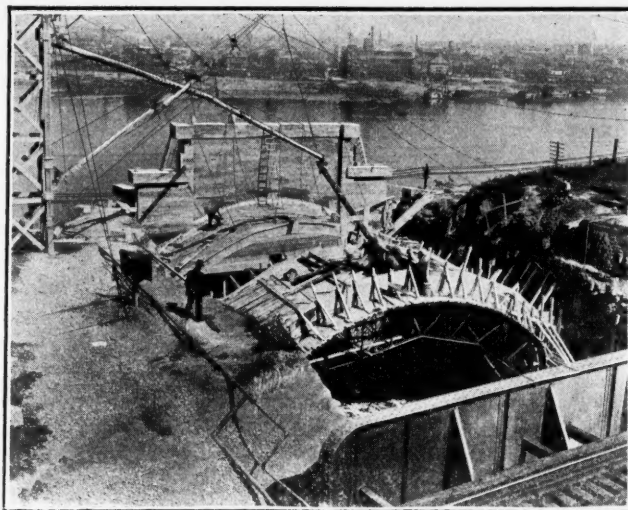
The cost of stock and laying a shingle roof is \$7.00 to \$8.00 a square and its life was said to be 15 to 20 years. The abandonment of the wood shingle, it was agreed, would mean increased building costs. At present about \$100,000 worth of shingles are used annually in the Metropolitan Fire Prevention District.

The fire prevention commissioner approves the committee's findings and says the shingle issue is the most important work he is engaged upon. For the city of Lynn in particular there is great need of such an ordinance. Already some of the committees forbid further shingle construction, and it should be the rule the district over. Even farm buildings should not be exempt, the commissioner holds, for farmers often burn wood which gives off dangerous sparks.

CORLISS STREET TUNNEL.

Pittsburgh, Pa., has recently completed and dedicated what is known as the Corliss street tunnel, the object of which is to provide a more direct route between a section of the city known as Sheraden and the main business district. A general description of this tunnel was given in our issue of July 2, when the work was under way.

The construction was done by cut and cover rather than by tunneling, and involved a long, deep cut through shale rock and some sections of solid rock. During construction it was necessary to brace two trestles and erect two short iron bridges for the panhandle railroad, which passed over the tunnel; also the Pittsburgh (street) Railways Company had to relay one of its main lines. The general contract for the work was let for \$179,681, to which \$10,000 was added subsequently for paving the street; and the sum of these two is the net cost to the city, except that this will probably be somewhat diminished by benefits assessed on abutting property. The Pittsburgh Railways Company was granted a franchise on the street limited to twenty-five years, and that company bore the expense of the paving of the portion of the street covered by its tracks and for one foot on each



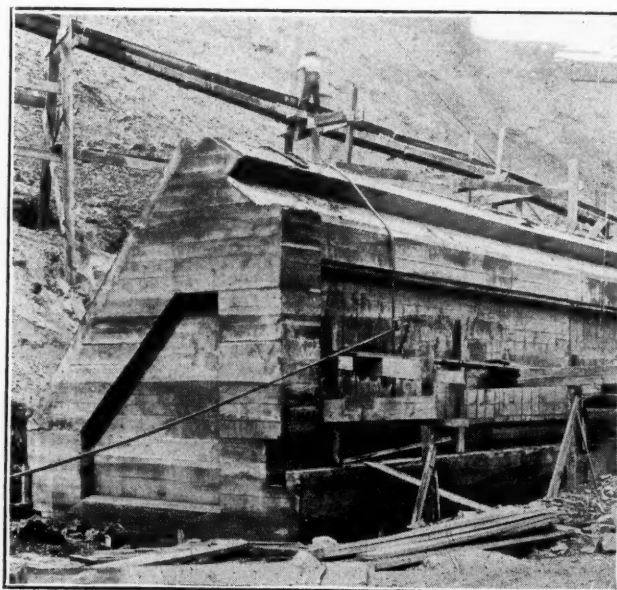
Courtesy Pittsburgh Industrial Development Commission.
PLACING CONCRETE IN ARCH.

side. Altogether, the total cost to the city, the Pennsylvania Railroad and the Pittsburgh Railways Company total about \$500,000.

In addition to tunneling, the street was straightened by relocating it at several points, this involving an interchange of property between the city and railroad company.

After the excavation of the cut was completed, side walls were built and an arch of reinforced concrete, the crown of which was 21 feet above the street level for about four-fifths of the length and 25 feet to about one-fifth of the length. The roof of the tunnel is paneled and the side walls are faced with vitrified glazed brick. Waterproofing was applied to the concrete to prevent the seeping through of ground water, 33,000 square feet of surface being waterproofed. Forty-eight thousand, three hundred pounds of steel reinforcement were used in the construction and 7,300 cubic yards of concrete.

The cut averaged 40 feet in width for a distance of 420 feet, and the total excavation in the cut was about 43,000 cubic yards of earth and rock, there being 15,000 cubic yards additional excavation outside of the cut. After the concrete arch had set, filling was dumped on the same up to the level of the surrounding ground surface.



Courtesy Pittsburgh Industrial Development Commission.
SECTION OF WALL, SHOWING SKEWBACK.

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

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FEBRUARY 11, 1915.

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Refuse Disposal North and South.

The United States is a large country and embraces within its borders a geographical latitude which is accompanied by a great variety of climatic and other conditions. This is a trite saying, and it would seem to be unnecessary to repeat what everyone is so familiar with; and yet the fact seems to be frequently overlooked in the consideration of many matters. One of these is brought forcibly to mind by two articles in this week's issue dealing with refuse disposal in southern cities. Each of these calls attention to the considerable difference in conditions and requirements as to refuse disposal between the cities of the north and those of the southern states; and yet it is often assumed that a type of plant which is most suitable for the one is therefore equally to be preferred for the other section of the country also. In fact, some appear even to go so far as to assume that the method of treating refuse and the type of plants used therefor which are found to be most suitable for conditions in England or in Germany must necessarily be similarly the best for the United States.

The articles in this issue just referred to bring out quite clearly the reasons why such assumptions may be and in this case appear undoubtedly to be unjustifiable. Three methods of disposing of refuse are referred to—incinera-

tion, utilization by extracting grease and tankage and utilization by feeding to hogs. It appears that southern garbage contains much less meat and fat than does northern garbage, and that it is more difficult to compel southern help to keep glass and other objectionable matter out of the garbage pails (this latter might perhaps be questioned), as a result of which utilization by extracting grease from such garbage could not be profitable. Again, the difference in temperature causes a more rapid spoiling and putrefying of the garbage in the south than in the north and thus increases the difficulty of getting the garbage to the hogs while it is yet in a condition suitable for food for them. (This also might possibly be questioned, since it would seem to be chiefly a matter of frequent collections under strict municipal control and immediate feeding of the garbage to the hogs before it had begun to sour. Such frequent collections might add unduly to the cost, however).

Assuming from the above that the only practicable and sanitary method of disposal for southern cities is by burning, we again have to consider what effect the difference in the character of southern refuse from that collected in the north will have upon the design of the furnace and method of operating it. It is stated in one of the articles in this issue that the southern refuse contains not only less fatty material but also a great deal larger percentage of vegetable matter of high water content, such as water-melon rinds; also a much larger percentage of light combustible refuse, such as boxes; also that ashes form a very much smaller proportion of the material collected. It is, of course, apparent to all that garbage or mixed refuse cannot be burned successfully in an ordinary furnace, but that the incinerator for such material must differ in many essential particulars from an ordinary coal-burning furnace. Similarly it would seem probable that such a considerable difference in the character of the refuse to be burned would call for corresponding differences in the construction of the furnaces in order to secure the best results; and that consequently a furnace which was most satisfactory in destroying northern refuse might not be equally so for dealing with that of a southern city.

The moral of which would appear to be that in this as in every other important municipal operation, mere imitation of what has proved successful elsewhere is but a make-shift method of deciding any matter of this kind; and the only way of being certain of securing that method or device which will prove most efficient, economical and generally effective is to secure an expert diagnosis of the local conditions and then a careful selection of that method or apparatus which will best fit those conditions. A trip by non-experts to visit plants in other cities and a resulting decision to adopt the one which seemed to them most satisfactory of those inspected may cost less than the fee of an expert (or perhaps it may not), but if the matter is an important one or involves any considerable expenditure, such saving at the spigot is likely to result in a much larger and continuing loss at the bung-hole.

Street Cleaning Units.

An article in this issue gives some cost figures of street cleaning with a commendable amount of detail as to condition of pavement, etc., which permits of a real understanding of the work done. But, the area flushed is given in blocks instead of square yards or even lineal feet, which nullifies the value of the records to others so far as flushing is concerned. It is so simple to calculate once for all the area of each block of each street, and translate the foreman's report in blocks to equivalent cubic feet, that it is difficult to understand why this was not done.

STANDARD FIRE HOSE COUPLINGS.

A circular has recently been issued by the U. S. Bureau of Standards dealing with the national standard for hose couplings and fittings for public fire service. Readers of Municipal Journal have been informed at intervals during the past five years of the movement to secure the universal adoption by cities of a standard thread for hose couplings and hydrant nozzles in order that any city may send its fire-fighting apparatus to the assistance of any other city in its neighborhood and not find itself thwarted by inability to connect up with the fire hydrants.

This movement really began after the great Boston fire of 1872, but made very little progress until 1905, when the National Fire Protection Association prepared and published specifications for a national standard. Since that time the standard has been adopted by a large number of cities. These are named in the circular of the Bureau of Standards, and we find from the list that there are in Alabama 11; Alaska, 1; Arizona, 2; Arkansas, 3; California, 23; Canada, 4; Colorado, 7; Connecticut, 19; Delaware, 1; Florida, 11; Georgia, 27; Idaho, 5; Illinois, 39; Indiana, 14; Iowa, 16; Kansas, 30; Kentucky, 7; Louisiana, 3; Maine, 18; Maryland, 4; Massachusetts, 72; Mexico, 1; Michigan, 22; Minnesota, 12; Mississippi, 16; Missouri, 19; Montana, 10; Nebraska, 18; Nevada, 1; New Hampshire, 9; New Jersey, 20; New Mexico, 3; New York, 112; North Carolina, 15; North Dakota, 3; Ohio, 34; Oklahoma, 13; Ontario, 2; Oregon, 2; Pennsylvania, 45; Porto Rico, 1; Rhode Island, 10; South Carolina, 7; South Dakota, 7; Tennessee, 9; Texas, 35; Utah, 15; Vermont, 9; Virginia, 6; Washington, 13; West Virginia, 5; Wisconsin, 23; Wyoming, 2. The standard coupling has also been approved by the national societies of mechanical engineers, water works, fire engineers, fire underwriters and municipal improvements, firemen's association and a number of local water and fire organizations. Up to 1914, says the circular, the standard had been put into service in 287 towns and cities, either as new equipment or by adaptation of non-standard couplings to interchange with the standard.

Whether or not all will agree that this standard is the best which could have been devised, there would seem to be no question that its adoption by cities throughout the country has become so general that it would now be impracticable to change the standard, and it is therefore hoped that all cities will fall in line as promptly as possible and thus increase the possibility of mutual assistance between neighboring cities, and also of standardizing the manufacture of hose couplings and hydrant nozzles so that manufacturers can keep a larger supply of these in stock available for instant demand, since they will not be hampered by uncertainty as to which of fifty or more threads is likely to be called for.

STREET MAINTENANCE IN COLUMBIA.

According to the report for the year 1914 of John McNeal, city engineer of Columbia, S. C., that city's paved streets, of which there were 268,744 square yards, were maintained and cleaned during the year at a total cost of \$36,004; this cost including the construction of about six blocks of streets which were paved with gravel at an average cost of 18 cents a square yard and the filling and widening of others, placing cross drains, etc.

The paved streets were cleaned at a total cost of \$3,142.55, or 20.3 cents per cleaning a great square of 10,000 square feet. This does not include the removal of the sweepings, which was done by the garbage department.

Hand sweepers work constantly in the business section, the cost of which is included above. Daily accounts are kept of areas swept by machine.

An average daily force of thirty convict laborers were

employed during the year in working the streets at a total cost to the city for maintenance of 25 cents per day per laborer. This force worked 304 days during the year.

The department owned and operated 16 mules and 5 horses, which were maintained at the city stables, where also were maintained 12 mules and 11 horses used by the garbage, water, park and police departments. The total cost of maintenance per head per month, including wagon and harness repairs, was \$15.42.

The steam road roller was operated 195 days at a total cost for engineer, coal, oil, waste, etc., of \$1,089.95, or \$5.59 per day operated. This roller rolled or scarified 140 blocks at an average cost of \$7.78 per block. A 20-40 horse-power gasoline traction engine was operated 194 days at a total cost for engineer, gasoline, oil, waste and repairs for \$1,693.75, or \$8.73 per day operated. The amount of gasoline used was 3,475 gallons, or an average of 18 gallons per day operated. With this tractor the department hauled a combined scarifier and road machine in working 234 city blocks, giving an average cost of \$7.24 per block.

During the year the department purchased a horse pick-up sweeping machine at \$450, and two 1½-yard Watson grading wagons at \$126.75 each. It operates, in addition to the steam roller, traction engine, scarifier and road machine, and horse pick-up sweeping machine, referred to, two horse-drawn sweeping machines, an automatic street flushing machine, a horse-drawn road grading machine, two horse-drawn sprinkling wagons, three wheel scrapers, two rooter plows, seven two-horse dump wagons, one dump cart and a tamping machine.

BOSTON POLICE SIGNAL SYSTEM.

BY W. B. CONANT.

The Metropolitan Park Commission of Boston, Mass., has installed a police-call signal system on the Charles river esplanade, between Watertown and the Charles river dam.

About 55,000 feet of submarine cable is laid in the river channel and along the retaining wall. It consists of rubber and jute-covered copper conductor armored with wire. A branch line 4,000 feet long, to Fresh pond, in Watertown, is laid in the ground in steel-tape cable. The cables were furnished by the American Steel & Wire Co. of New York.

Twenty signal boxes, with telephone, are installed at intervals of several hundred feet, on iron posts or in booths. The signal is a ruby electric lamp enclosed in a clear glass acorn globe. There are six landing posts at points between the signal stations for the making of tests. A four-circuit perforating register and automatic dating stamp is installed in connection.



BOOTH WITH SIGNAL LAMP ON TOP.

The call lights are in view of police patrolling the water front and adjacent streets, and of the river patrol in motor boats. Calls for police aid are made from the headquarters of the Police Department at the dam. The system is of special value in cases of accidents in the skating season, and in canoeing and boating accidents in summer.

The signals, boxes and desk at the station were furnished by the Gamewell Fire Alarm Telegraph Company. The Park Department's employees installed the cables.

The WEEK'S NEWS

State Highway Construction and Financing in Wisconsin, California and Ohio—Paving Work of the Year in Fort Smith and Erie—Water Waste and Metering in Detroit and Salt Lake City—Proposes State Water Power Control in Maine—New Jersey's Gas Fight—Commission Progress and Reverses—Chicago's Budget—Minnesota Garbage Survey—New York and the Unemployed—Elizabeth's Municipal Exhibition.

ROADS AND PAVEMENTS

Would Cut Wisconsin Road Taxes.

Madison, Wis.—Methods for lowering the cost of good roads construction and maintenance to the taxpayers of the state are recommended in the biennial report of the state highway commission, filed with the governor. The commission recommends the state highway aid law be amended to provide: That state aid funds be apportioned among counties in proportion to their valuation, without respect to the amount to be expended in the county with the provision that unless certain sums be appropriated for road work in the counties, state aid would be relinquished in proportion to the deficiency between the county's appropriation and the amount called for by the full state aid, such reverted amounts to remain in the state highway fund until the succeeding year. That state and county aid for improvement of streets of cities be rescinded. That automobile license fees collected by the state shall be returned to the county in which they are paid, with the cost of collection and plates deducted, to be turned into the county's highway fund and be accounted for by the county highway commissioner to the state commission. That a system of county police be established to regulate automobile traffic, with authority to arrest, and that fines collected for violations of such regulations be applied to the costs of maintaining such police, courts' expenses and the remainder be used for highway repairs. That stringent regulations for width of tires be adopted by the highway commissioner or county police.

The commission makes no recommendations for money to be appropriated as state highway aid in 1916 or 1917.

California State Highway Plans.

Sacramento, Cal.—To direct loss in county highway financing into proper road building channels is the purpose of a bill introduced into assembly. The measure creates a division of county highways in connection with the state department of engineering, and gives the state engineer appointive and advisory powers in connection with the county roads. No mandatory powers are granted the state engineer. It vests in the boards of supervisors of the counties full executive power over the roads of the county. A county highway engineer is appointed for each county by the state engineer, who, under orders from the board of supervisors, builds and maintains the roads and bridges of the county. The duties of the boards of supervisors as road commissioners are not interfered with, and the present road law under which the counties are working is not changed.

Two features of the proposed bill are the creation and maintenance of a central information and consultation bureau in the department of engineering for the benefit of the counties, and the appointment of a county highway engineer for each county by the state engineer, which insures his being a skilled man and removes him from local politics.

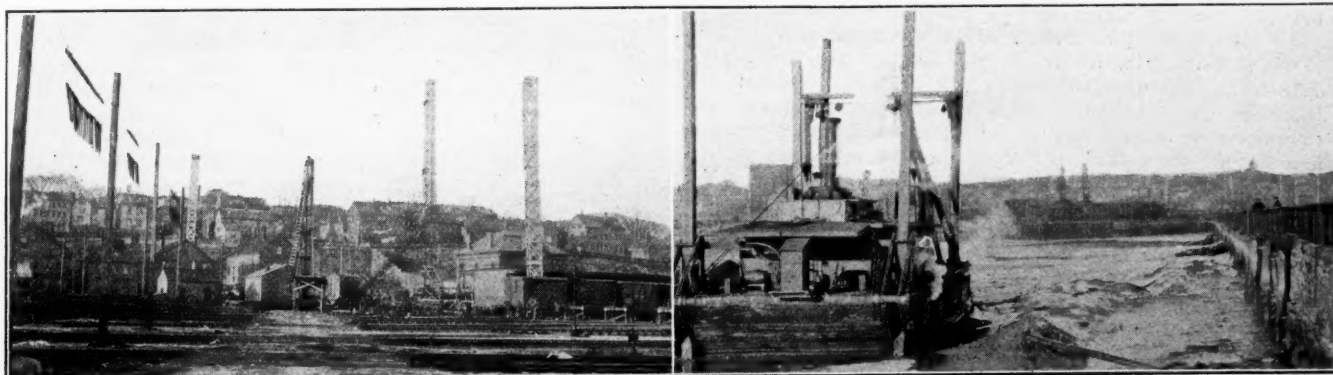
A definite plan for using convicts in the construction of the laterals connecting mountainous counties with the main artery of the State Highway in the valley has been prepared by Charles F. Stern, state highway commissioner. A bill providing for convict labor, along Stern's ideas, will be presented to the legislature for passage. Commissioner Stern said that the proposition to work convicts on lateral roads is not based on any peculiar theory of penology, but is a sane plan to meet a definite state need, because the \$18,000,000 voted in the state highway bond issue will be sufficient only to construct the two main trunk lines. This plan proposes to pay the convict for efficient, loyal co-operation on this state work by giving him a half day in credit time for every day of service.

Work on New Portland, Me., Bridge.

Portland, Me.—Work on the new bridge between Portland and South Portland is in active progress, the temporary bridge built to carry the diverted traffic being almost completed. The tearing up of the old bridge will then be pushed to make room for the piles of the new and permanent structure. The bridge will be in four sections. The first is an approach consisting of a fill of 850 feet; the second consists of another fill and a reinforced concrete superstructure in 12 spans 300 feet long; the third section spans the harbor and consists of ten piers, seven steel plate girder spans, two steel truss spans and a rolling lift draw—the latter being 126 feet in length; the next portion consists of a reinforced concrete viaduct about 700 feet in length. The lighting system of the bridge will be an underground cable system. The accompanying illustrations show the concrete distributing plant of T. F. Stuart & Son and work on the beginning of the fill by the dredges of the Bay State Dredging Company. Holbrook, Cabot & Rollins Company has erected a plant for building the caissons.

Proposed Revision of Ohio Highway Code.

Columbus, O.—A new code of Ohio road laws is ready for consideration of the general assembly. It is contained in the report of the codification of the good roads committee, appointed by the last assembly. The central



Courtesy Portland (Me.) Evening Express and Advertiser.

CONSTRUCTION SCENES OF NEW PORTLAND (ME.) BRIDGE.

authority of the proposed new system is a state commission of three members at \$5,000 a year each, to replace the present state highway commissioner, who receives \$4,000 a year. Representative W. A. Hite, author of the good roads laws of the last legislature, favored an advisory commission of three members at nominal salaries, the executive duties of the department to be performed by a chief engineer appointed by the commission. The number of Ohio road statutes was reduced from 1,000 to 299 by the codification, mostly by eliminating duplication. The chief purpose is to centralize responsibility. The code provides that the county surveyor is ex-officio the county highway commissioner, and that he appoint a superintendent for each township. The surveyor would receive no more than now in the large counties, but in the smaller counties he would get a fixed salary instead of a per diem. The township superintendent would replace the four to eight supervisors now in each township, and would receive a maximum salary of \$500. The code preserves all the present methods of road construction and repair, but only the county commissioners could establish new roads. This would leave intact the Gehrett township road law, by which nearly all improvements are made in northwestern Ohio. The committee endeavored to make practicable the provision for convict labor on the roads, which was unworkable in the old statute. Under the proposed provision the state would be responsible for the discipline and the local authorities for the work. It would be up to the state to guard the convicts.

Paving Costs in Fort Smith, Ark.

Fort Smith, Ark.—George T. Carnall, city secretary, states that in 1907 the city let a contract for 835,000 square yards of pavement, which was to be laid on the streets of Fort Smith. This pavement when laid would have covered the majority of all the streets in the city at that time. Since this contract was let the city has been enlarged by adding additional territory. Fort Smith has now pavement laid as follows: Brick pavement, 43.19 miles; concrete pavement, 26.67; wood block, .73; asphaltic macadam, .87; water-bound macadam, 22; total, 93.46 miles. The contract price for brick pavement is 81¼ cents per square yard for completed pavement; the concrete pavement laid by contract cost 75 cents per square yard for completed pavement, and the water-bound macadam costs 35 cents per square yard, which is increased in proportion to the length of haul; wood block \$1.78 per square yard, asphaltic macadam 75 cents per square yard. The majority of concrete pavement (approximately 293,000 square yards) has been laid by force account and has cost from 70 cents to \$1.15 per square yard, depending upon the amount of grading. Some of this pavement has been laid where rock excavation was necessary.

Year's Street Work in Erie, Pa.

Erie, Pa.—In the report of B. E. Briggs, city engineer, it is calculated that there are 129 miles of open streets, sixty-five of which are paved. Sewers extend for a distance of 101.73 miles. During 1913 the city laid 46,736.43 square yards of asphalt pavement and 1,676.42 square yards of brick pavement. In 1914 there were 96,579.11 square yards of asphalt pavement laid and 1,582.83 square yards of brick, a total of 5.26 miles. The average price per square yard for asphalt pavement in 1913 was \$1.37 and for brick \$1.44, and in 1914, for asphalt \$1.53, and for brick \$1.67. The total cost of repairs was \$10,957. Repairs last year cost the city \$9,557.39. It is brought out in the report that the cost of pavements and repairing has decreased by nearly half since 1893. At that time the city paid as high as \$2.32 for work which is now done for \$1.32 a foot. The cost of operation of the municipal asphalt plant in 1913 was \$13,912.25. There are 11,147.32 square yards of pavement repaired. The net cost of labor and material was \$12,327.25. In 1914, the total cost of labor and material amounted to \$13,043.63, and the total cost of operation, \$14,628.63. There were 11,126.44 square yards of pavements repaired. The city constructed 14,461 feet of sewers in 1913 and 12,846 feet last year. The cost during the first year was 81 cents a foot and in 1914, 72 cents. In storm sewer construction, during 1913, there

was constructed 1,700 lineal feet of concrete and 26,420 lineal feet of from twelve to thirty-inch pipe sewer, at a total cost of \$45,547.65. In 1914, there was laid 30,740 feet of from twelve to thirty-inch pipe sewer at a cost of \$30,063.75.

WATER SUPPLY

City Wins in Valuation Contention.

Janesville, Wis.—On or before July 1, 1915, the city of Janesville will be operating the local water plant. The state railroad commission has fixed the valuation of the Janesville water works at \$265,500, practically the amount which the city officials claimed was a fair estimate. The commission held that the company's figure of \$380,000 to \$390,000 was excessive and criticised the attitude taken by the company's attorneys that the members of the engineering staff of the commission which made the appraisal, were biased in favor of the city. There is no grounds for such an attitude, the commission maintains. Mayor Fathers says that the city will take possession of the plant as soon as the necessary arrangements can be made for raising the amount to be paid.

Burst Main Floods New York Theatre Section.

New York, N. Y.—The bursting of a 30-inch main near the heart of the theatre district broke up the pavement in several blocks, put many passers-by in danger and flooded the basements of all the buildings in the area. The lights were put out and the residents of the section were forced to vacate the houses by the police because of danger of undermining. Traffic was suspended. By turning off the mains and then turning them on the broken one was finally discovered. Commissioner Woods and Inspector Dwyer were in charge of the police. Thirty men from the Department of Water Supply, Gas and Electricity under Merritt T. Smith, chief engineer, and Engineer Byrne ripped up the streets to locate the exact spot of the break. Damage to the flooded cellars is estimated at about \$100,000.

Metering in Detroit.

Detroit, Mich.—Superintendent Theodore A. Leisen and the water board are asking for about \$561,000 to complete the installation of meters. About 21,000 are now in service and about 100,000 are needed altogether. The water officials contend that the cost and maintenance of the system fully metered would be less than at present. The inspection cost would increase, admits Mr. Leisen, and the revenue would not increase—but the pumpage would be materially decreased, affecting a saving in coal and the danger of immediate need of new sources of supply would be put off. The present consumption is 170 gallons per capita and Mr. Leisen says that 50 gallons of this is avoidable waste. A new chlorine purifying plant is to be installed.

Water Plant Profitable.

Aberdeen, Wash.—More than \$40,000 is earned annually by Aberdeen's municipal water system, according to the annual report submitted by the department. This is net profit and is 61.5 per cent. of the water department's total earnings. Out of the \$40,000 the sum of \$28,000 was expended in 1914 for the building of the Fairview reservoir. No charge is made against the city for water used for flushing city streets and sewers, maintenance of drinking fountains and other municipal uses of water. Assets of the water department, according to City Treasurer T. H. Hill's report, are \$263,411.03. Storage, distribution and transmission system is valued at \$142,040.29. Liabilities are less than \$2,000. The \$40,000 annual earnings—figures for which are based on the past seven months' earnings—represent about 16 per cent. on the total investment.

Warns Salt Lake City Against Waste.

Salt Lake City, Utah.—In a letter sent to the city commission with his annual report, Superintendent Charles F. Barrett, of the water department, asserts that an average of 4,000,000 gallons of water is wasted daily in Salt

Lake by consumers. During the past year the department has had careful supply and consumption surveys made to determine the amount of water going into the system, the amount paid for and the amount actually consumed by the consumers. Immediate steps to assure an ample supply of water for Salt Lake this year, are recommended. Mr. Barrett asserts that the snowfall this winter has been so light that the city will face serious shortage of supply this summer during the low water season unless steps are taken to provide additional water from other sources than the city's present supply. The superintendent says that during 1914 an average of 20,028,731 gallons of water a day were consumed in the city and he figures that the demand during the present year will be at least 21,000,000 gallons daily. Increased use of meters is recommended as a solution to the waste problem. It is suggested that the meter deposit be reduced to encourage installation of meters. Mr. Barrett contends that the consumer will save money on his water bill by installing a meter and the city will conserve its supply.

Floods End Fear of Famine.

Paris, Ill.—The heavy rain within the last few days has caused the water in reservoir lake to rise three feet and it is now within four feet of the top of the spillway. This relieves all danger of another water famine until next fall, at least, when the new reservoir will probably be completed. Chairman Risser, of the water board, announced that the city water would be on continuously in the future, it having been the custom to shut it off from 11 o'clock each night until 6 o'clock the next morning.

Bloomington, Ind.—The water famine in Bloomington came to an end when the Leonard Springs lake filled with melting snow and rain. It is believed that even without another fall of rain Bloomington will have enough water to last for at least one year.

STREET LIGHTING AND POWER

Expert to Make Gas Survey.

Grand Rapids, Mich.—William C. Newbigging, the gas survey expert of Manchester, England, who has been employed by the council to make a survey of the Grand Rapids Gas Light Company, has begun work. Mr. Newbigging expects to deliver his report by March 1 so that it may be fully considered before the questions of municipal ownership and the 75-cent rate offer of the company are submitted to the people at the March 16 primaries.

Proposes State Ownership of Water Power.

Augusta, Me.—State ownership and control of all the water powers in the state is the object of an act introduced in the Senate by Senator Hastings, of Androscoggin. The act creates the People's Water Rights and Power Commission, to take over all unoccupied and occupied water powers in the state, paying for the abutting land in the case of occupied powers. The commission may develop water powers and sell the power, or lease the water powers, but not for a period of more than 10 years. This act provides for a commission of five men, one of whom shall be an expert civil engineer, one an expert hydraulic and electrical engineer, two experienced dam builders, and the fifth a capable business man. They are to pass a civil service examination before a board consisting of four professors of sciences, one from each of the four Maine colleges, to be designated by the presidents. The appointments are to be made by the Governor upon recommendation by this board. Provision is also made for their removal for cause after hearing by the executive council.

This commission is authorized to ascertain the amount and location of all water powers, occupied and unoccupied in the state. It is to take possession of all unoccupied powers and let them to manufacturers or others in want of cheap power. It is to acquire land necessary for the work of developing such powers and is given rights of eminent domain for this purpose. The bill also authorizes the commission to take over all occupied water

powers in the state. Provision is made for paying owners of such powers for the abutting land. In leasing such seized occupied power, the commissioners are to give preference to the person, company or corporation from which it is taken. The price, which is to be charged for power from such plants, is not to be less than \$20 per horsepower per year. Provision is also made for the commission to allow a company or corporation to lease and improve unoccupied water powers under a ten-year lease, which may be renewed in periods of ten years at a rental of \$20 per horsepower per year for the first ten years. The maximum price which the commission shall charge for power is fixed at \$50 per horsepower per year. The rental is to be paid quarterly. The commissioners are to receive \$1,800 per year, with traveling expenses, and are to have quarters in the state house. They are to have a clerk at a salary of \$1,200 a year. The act takes control of water powers from the public utilities commission.

Progress of New Jersey Rate Case.

Trenton, N. J.—The Court of Errors and Appeals has granted the application of George L. Record and other counsel representing the cities of Passaic and Paterson and the New Jersey Public Utility Commissioners for a reargument of the 90-cent gas rate. This is hailed by the fighting cities as practically a recall of a judicial decision. Chancellor Walker gave no reason for the permission. Meanwhile legislation to eliminate such conditions as brought about the case is being considered by the legislature. The mayors of the cities concerned are holding conferences at frequent intervals—in fact a league of cities has been formed and a bill is to be presented asking that the cities be given power to send delegates to conventions and to spend money when necessary. The organization decided that it would not at present approve the Dolan bill calling for the taxing of franchises of corporations but should the gas case be lost it will then be approved. A bill known as the Kates bill is pending which prohibits any judge in the state from sitting in any litigation in which he has either a direct or an indirect interest. This bill is aimed at Judge Heppenheimer of the court of errors and appeals, who was one of the six judges giving the now-famous decision and who was found to be an officer of two corporations holding large securities in the public service companies.

FIRE AND POLICE

"Part Pay" Police System Revived.

Dallas, Tex.—An ordinance reviving the old "part pay" police system has been passed by the board of city commissioners and signed by Mayor Holland. The ordinance limits the number of part pay men to 25 and fixes the maximum which the city shall pay them at \$25 per month. The balance will be collected from citizens whose property they guard. The part pay men are subject in all respects to regulations of the department with the exception that they are subject to dismissal without a formal hearing before the board.

Want Police Women in Indiana.

Indianapolis, Ind.—A bill making mandatory the appointment of police women in cities of the first, second, third and fourth classes in the state was introduced by Representative McClaskey. The bill provides that in every such city one woman shall be appointed to the police force for every twenty men now on the force or for every twenty appointed hereafter. The appointment shall be made through the regular channel of appointment to the police forces, and the same restrictions which apply to the appointment of male members to the forces shall apply to the appointment of women, according to the provisions of the bill. The duties of the police women are to be similar to the duties of all male members of the forces with the exception that women shall not be required to serve subpoenas. The bill stipulates that they shall pay particular attention to the female offenders brought to the attention of the department.

Two-Platoon Legislation in Massachusetts.

Boston, Mass.—The division of the permanent fire fighting departments of the cities and towns of Massachusetts into two platoons, a day force and a night force, is the purpose of a bill put into the legislature at the request of the Massachusetts Firemen's Association. If the bill goes through the legislature it will be submitted to the voters of each city and town at the next state election. The hours of duty are to be: 8 a. m. to 6 p. m. for the day force and 6 p. m. to 8 a. m. for the night force. On every fourth day, for the purpose of alternating the platoons, the hours are exceeded. Any or all men in the department are liable to call in case of a serious conflagration—when, in Boston, half the apparatus is called out or in other cities when a general alarm is sounded. The election to decide on the adoption of the system shall be called when 15 per cent of the registered voters sign the petition.

MOTOR VEHICLES**Motorcycles for Fresno Firemen.**

Fresno, Cal.—Since 1909 when Chief John Wintermute used the first Harley-Davidson motorcycle bought by the department, the number of these cycles has rapidly increased. Assistant Chief Thomas Baird three months later replaced his horse and buggy by a Harley-Davidson cycle. The accompanying illustration shows fifteen of these cycles, made by the Harley-Davidson Motor Company, Milwaukee, Wis., now in the service of the department.

New Hook and Ladder.

Larchmont, N. Y.—Larchmont now has an up-to-date automobile hook and ladder truck. It is a type No. 14, combination city service truck with a 75-horsepower motor, manufactured by the American-La France Fire Engine Company, Elmira, N. Y. Its equipment includes five extension ladders, three single ladders, two roof ladders, a 40-gallon chemical tank with 200 feet of hose, a large life net, a locomotive bell, a hand-operated siren-horn, a gas searchlight, two electric headlights and the usual miscellaneous tools. The machine cost \$6,000, which amount was raised by a bond issue.

Cost of Auto Maintenance in Lowell.

Lowell, Mass.—The automobile expense of the fire department for 1914 amounted to \$1,394.12. The amount of gasoline used was 782 gallons, and amount of oil 74 gallons. The total number of miles covered by the four pieces of motorized apparatus was 1,335. The total amount, \$1,394.12, represents repairs and upkeep. The cost of maintaining the horse drawn apparatus for the year was \$11,289.29. Of this amount \$7,041.37 went for hay and grain; \$1,033.18 for shoeing; for repairs to wagons, \$2,928.81; for harness repairs, \$88.93, and for veterinary surgeons, \$195. The department claims that if the apparatus were all motorized the large expense for maintenance of horses would be cut off and there would be an auto repair shop to keep down the bill for repairs.

GOVERNMENT AND FINANCE**Commission Victories and Defeats.**

Freeport, Ill.—Freeport defeated a proposition to adopt a commission form of government at the polls here by 55 majority. The plan to abolish minority representation in council and to reduce the number of aldermen from 15 to 10 was adopted.

Yoakum, Tex.—In an election held here the commission form of government won by a vote of 215 for and 180 against.

Belmar, N. J.—Commission government was rejected in Belmar by a vote of 134 for and 233 against.

Bradley Beach, N. J.—Bradley Beach voted on commission government, and the new rule carried by a majority of 43, the vote being 234 for and 191 against.

Munising, Mich.—By the adoption of its new charter by an overwhelming vote, this city is now commission governed. Thomas G. Sullivan and his associates, who were at the head of the village government, will be the first officials of Munising, the city, Mr. Sullivan, R. H. Stewart and Herman Johnson to constitute the municipal commission.

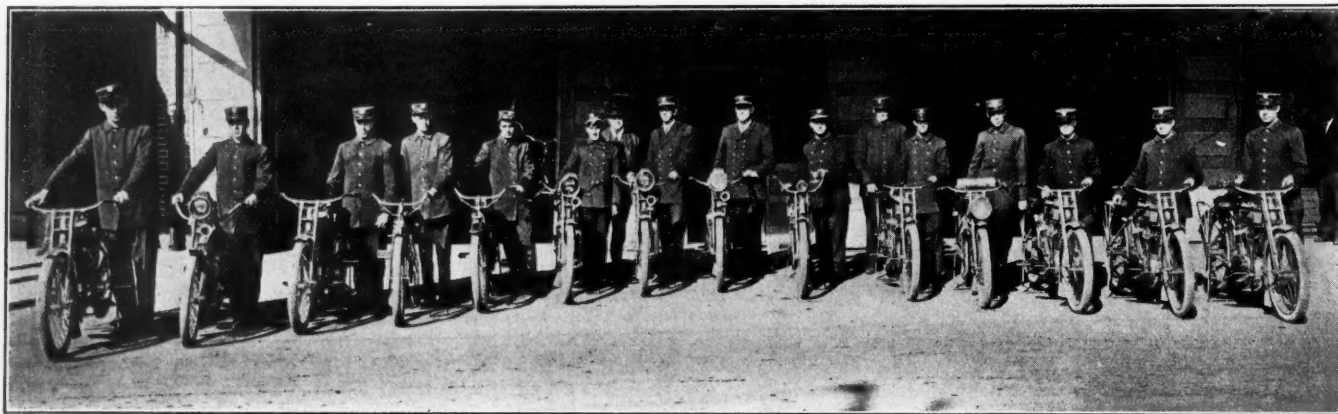
Chicago's Budget.

Chicago, Ill.—The budget total for 1915 is \$86,163,035. Fully \$20,000,000 of that will not be spent this year. Some of the money is dependent upon bond issues to be approved by the voters. It is improbable that all of the issues proposed will be sanctioned. More appropriated is in the form of taxes yet to be collected. The addition of 210 policemen to the force will increase the protection for life and property. For fire protection half a dozen new companies are provided. They are to be engaged when stations are erected and apparatus is purchased. For cleaning the streets and removal of garbage, ashes and other refuse \$3,900,044 was appropriated in 1914, according to the comptroller's estimates. This year the appropriation is \$3,807,376. The amount appropriated for sewer cleaning and repairs is nearly \$100,000 less than last year. A summary of the appropriation bill is as follows:

Corporate purposes.....	\$27,655,013
Schools	20,770,000
Library.....	1,055,000
Tuberculosis sanitarium.....	1,080,000
Water plant.....	8,742,422
Street repairs.....	849,400
Harbor	2,381,765
Motor buses.....	3,000,000
Subways	2,000,000
Hospitals and baths.....	855,437
Beaches and playgrounds.....	940,000
New bridges.....	2,450,878
Boulevard link.....	3,800,000
Twelfth street.....	1,750,000
Garbage plant.....	700,000
House of Correction.....	310,000
Fire stations.....	663,000
Police stations.....	2,500,000
Reimbursed items.....	1,776,400

Charter Committee Chooses City Manager Form.

Springfield, Mass.—The city manager form of government has been chosen by the citizens' charter commission after a formal vote. City Chamberlain Henry Bruere, of



FRESNO'S MOTOR CYCLE FIRE SQUAD.

New York, City Manager Henry M. Waite, of Dayton, and ex-Mayor Henry T. Hunt, of Cincinnati, O., addressed the commission on separate nights, and then six meetings were devoted to debating the question. When the details of the charter are drawn, it will then be submitted to the legislature, and following that there will be a referendum vote on the question before the city.

New Government Forms for Indiana Cities.

Indianapolis, Ind.—A bill has been introduced in the senate to permit the establishment of the commission or the commission-manager form of government in any city of the state. A special election to decide whether a city will adopt one of these systems of government must be held upon the petition of 15 per cent of the voters, according to vote cast at the last election.

STREET CLEANING AND REFUSE DISPOSAL

Racine's Garbage Plant Successful.

Racine, Wis.—Racine's garbage plant is a success, according to a report filed with the board of public works by John Connolly, the superintendent. The report covers a period from Dec. 20, 1913, when the plant was started, to Dec. 31, 1914. Owing to the fact that scales for weighing the garbage were not installed until this summer, accurate figures covering the period could not be obtained. Such figures as are available, however, show that about 224 pounds of coal were used to consume one ton of garbage. The plant is now running full force, both furnaces are in use, and there are 6 wagons and 12 men working constantly.

Garbage Strike Broken.

Jersey City, N. J.—Squads of unemployed New Yorkers and twenty mounted policemen, with ready nightsticks broke the garbage collectors' strike in this city. The garbage men quit because the municipal contractors refused to sign an agreement providing that the men last engaged should be laid off whenever a reduction was to be made in the working force. In answer to advertisement in New York papers, several hundred men from that city reported at the Jersey office of the garbage contractors. About a hundred men were sent out, with Jersey City's entire mounted police, to gather in the garbage. Several riots occurred, but the police quelled the strikers and made ten arrests.

State Survey of Garbage Handling Methods.

St. Paul, Minn.—A survey of the problems connected with the disposal of garbage in Minnesota municipalities is being undertaken by the municipal reference bureau of the University of Minnesota general extension division. G. A. Gesell, director of the research bureau, has charge of the collection and compilation of the information. Besides the cities of St. Paul, Minneapolis, and Duluth, the investigation will be carried to about 100 of the smaller towns of the state in which the question of garbage disposal has passed beyond the stage of each individual household disposing of its own refuse. "It is not expected that anything like adequate provision for the disposal of garbage will be found in more than two dozen of the municipalities, but the survey is being taken to have at the disposal of the members of the Minnesota Municipal League information showing the exact state of affairs," Professor Gesell said. The questions which will be sent to the several municipalities request information covering the details of finance, methods of collection and general success. Some of the typical questions asked are, "Is the garbage collected by municipal or private parties? If by private parties, what is the financial arrangement with the municipality?" Other questions are: "Are the householders required to use a particular kind of receptacle? How often are the collections made? What are the rates charged the householder? Is provision made for the collection of ashes and manure? Are cans of garbage and rubbish collected at the same time, or are they separated from the garbage proper? If required to be sep-

arated, are they collected at any time by the city?" The methods employed by the individual towns in the collection of the garbage are covered by another set of questions.

"What kind of wagons are used for collection? Are they water tight? What means are used for cleaning the wagons and keeping them sanitary? How often is this done?" The various methods of disposing of garbage also will be ascertained by the query. The several varying methods of giving or selling it to farmers, using a "dump," or other more scientific means such as reducing plants or incinerators will be found out in answer to the general question, "How is the garbage disposed of?" A request is to be sent with the queries asking for copies of the ordinances relating to the garbage question. When the returns are received, the ordinances in use in the municipalities will be compiled for the use of the members of the League of Minnesota Municipalities. It is expected that the entire results of the investigation after being classified will be printed and at the service of all municipalities that desire information on the subject.

MISCELLANEOUS

New York's Relief for the Unemployed.

New York, N. Y.—Appropriations amounting to \$136,500 calculated to relieve the distress caused by the unemployment situation were passed by the board of aldermen. Park Commissioner Whittle, of the Bronx, says he will be able to put several hundred men at work with \$101,000 granted to him for clearing away the dead trees and opening up the forest lands under his jurisdiction. Ten thousand dollars was set aside for the armory board to pay the expenses of opening two armories as places of refuge for the homeless in case of severe weather and extreme necessity.

Cleveland Wins Land After 12-Year Fight.

Cleveland, O.—The city of Cleveland has formally taken possession of 30 acres of lake-front land, estimated to be worth \$20,000,000, and for which the city has fought the Pennsylvania and New York Central railroad companies for years. Armed with a writ of ejectment issued by the county clerk, Mayor Baker invaded the network of railroad tracks covering the ground and formally declared the territory to belong to the city. The United States Supreme Court on Oct. 16 decided the land was the city's property. The Farmers' Loan & Trust Co. of New York then sought an injunction and asked that the city's title to the land be declared invalid on the ground that the Cleveland & Pittsburgh Railroad Co. holds a \$10,000,000 mortgage on the property. The federal court refused the injunction and the mayor was advised by his attorneys that the city could take immediate possession of the land.

Municipal Exhibition in Elizabeth.

Elizabeth, N. J.—An exhibition by the departments of this city which lasted a week drew larger crowds of interested citizens. In addition to the exhibits of maps, charts, pictures and the like, there were several speakers. Each day was apportioned off to a special purpose, as Elizabeth Day on Monday and Board of Trade Day on Tuesday. Mayor Mravlag spoke on the opening day and during the week talks by the following were given: James Wood Pogue, vice-president of the Sheldon School of Business Science, on the "Science of City Building"; Ernest P. Goodrich, consulting engineer of the Borough of Manhattan, on "City Planning"; William L. Kinkead, of Paterson, president of the New Jersey Housing Commission, on "The Housing Problem," and Dr. Charles F. Kraemer, of Newark, president of the Conference on Interurban Improvement, on "Interurban Development." City Engineer Thomas E. Collins was chairman of the committee in charge of arranging the exhibit. The activities represented at the exhibit were as follows: City departments of education, engineering, fire, health, library, playgrounds and police; Charity Organization Society; Board of Trade and Conference on Interurban Improvement.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Establishing Grade of Street—Removal of Lateral Support—Liability.

Schuss et ux. v. City of Chehalis.—A city, removing lateral support in making an original street grade, is not liable for injuries to abutting property, where the grading was wholly within the limits of the street and the work was not negligently done.—Supreme Court of Washington, 144 P. R. 916.

Parol Contract by Commissioners—Validity.

McKinney v. City of Wagoner.—The charter of the city of Wagoner having provided that "no contract shall be binding upon the city unless it has been signed by the mayor and countersigned by the city clerk," a parol contract entered into by one of its commissioners on behalf of the city to furnish electric power, although known and acquiesced in by the other commissioners, is not binding upon the city.—Supreme Court of Oklahoma, 144 P. R. 1071.

Care of Streets—Sewer Excavations—Nuisance.

Frohs v. City of Dubuque.—A city, by statute required to keep its streets in repair and free from nuisance, though excavations for laying sewer pipes therein did not necessarily constitute a "nuisance," was bound at all times to exercise ordinary care in guarding travelers against injury, by barricades or lights warning against danger therefrom, which duty was none the less imperative where they were made by licensees or independent contractors, and which duty it could not delegate.—Supreme Court of Iowa, 150 N. W. R., 62.

Civil Service—Abolishing Office—Purpose.

State ex rel. Gilmur v. City of Seattle et al.—Where, after relator had obtained a final decree restraining a city from removing him from an office in the classified civil service, and to circumvent the effect of the decree the city attempted to abolish the office solely to rid itself of relator and not of the office, which it recreated by passing another ordinance taking effect immediately on the going into effect of the ordinance abolishing the office, such action was mala fide, and relator was entitled to compel the city by mandamus to permit him to fill the office.—Supreme Court of Washington, 145 P. R., 61.

Damages From Mob Violence—Liability of City.

Blakeman v. City of Wichita.—A large number of persons confined together in a city jail, who joined together to whip another prisoner, and who did severely whip and injure him, are held to be a "mob" or "riotous assemblage" within the meaning of the statute making cities liable for damages resulting from mob violence. The fact that these persons did not voluntarily come into the jail does not prevent their action from being that of a mob, nor is the primary purpose for which they assembled material if they, in fact, formed and executed the unlawful purpose after they were brought together.—Supreme Court of Kansas, 144 P. R., 816.

Special Laws—Bridges—Validity.

State ex. rel. Village of Merrimac et. al. v. Hazelwood et al. State Highway Commission.—Laws 1913, c. 586, authorizing the construction of a bridge across the Wisconsin River, partly at the expense of particular municipalities in two counties, partly at the expense of the counties, and partly at the expense of the state, according to a plan entirely different from that provided by St. 1913, Secs. 1318-1321a, for the construction of bridges generally over navigable waters of the state, was unconstitutional as violating Const. art. 4, Sec. 23, establishing one system of town and county government, which is required to be as nearly uniform as practicable.—Supreme Court of Wisconsin, 149 N. W. R. 141.

Streets—Personal Injuries—Jury Question.

Wrigley v. City of Watervliet.—Where, in an action for injuries from stepping into an open, unguarded trench, while walking on the sidewalk, it appeared that the trench was constructed under a permit from the city, the question whether the city was chargeable with notice of the dangerous condition of the street was for the jury.—Supreme Court, Appellate Division, Third Department, 150 N. Y. S. 908.

Assessments—Special Benefits—Enjoinments.

Stoughton State Bank v. City of Stoughton et al.—Where plaintiff's property was condemned and the damages assessed, which he sustained by the taking, and under St. 1913, sec. 899, the special benefits were deducted from such damages, the city will be enjoined from the collection of a special benefit assessed against the property, under section 903, on the ground that plaintiff had paid such benefit by having the amount thereof deducted from the damages awarded him.—Supreme Court of Wisconsin, 150 N. W. R. 418.

Torts—Liability of City.

Murray v. City of Boston.—Where a city relocates its water pipes on order of the transit commission, building a subway by virtue of St. 1894, c. 548, and does the work itself, it is liable, and not the commission, for negligence in so doing, as in constructing and maintaining its waterworks and distributing pipes the city is voluntarily carrying on a business for which it receives compensation, and it is acting in its private and corporate capacity, and not as a public agency of the state.—Supreme Judicial Court of Massachusetts, Suffolk, 107 N. E. R., 416.

Personal Injuries—Liability of City—Validity of Incorporation.

Horner v. City of Atchison.—The plaintiff sued the city for damages for personal injuries resulting from the collapse of a bridge. The defense was that the bridge was not in the city. The proof was that, upon taking in an addition of the city, not adjacent to the bridge, the bridge had been left outside the city limits by an ordinance changing and defining the boundaries of the city. Held, the plaintiff could not make a collateral attack upon the corporate organization of the city by questioning the validity of the ordinance.—Supreme Court of Kansas, 144 P. R. 1010.

Public Water Supply—Overflow—Municipal Negligence.

Kelly v. Inhabitants of Town of Winthrop.—Regarding a town's liability for overflow of its standpipe onto adjacent property, though the regulation valve, clogging of which occasioned it, was under control of the Metropolitan water system, with the conduits of which the town's service pipes were connected, yet it being unquestioned that, if foreign substances in the water passed into the valve, it would cease to work automatically, and leak, flooding the standpipe, and there being evidence that an overflow pipe, which would have prevented the damage, was feasible, the jury could find the town reasonably ought to have anticipated and guarded against the condition.—Supreme Judicial Court of Massachusetts, Suffolk, 107 N. E. R., 414.

Action for Injury to Person on Street—Evidence.

Borough of Du Bois v. Pancoast.—When plaintiff was passing along a street in defendant borough on a day when there was an unusually strong wind, a chimney on a four-story building, to which the end of a cable, from which a political banner was hung over the street, was attached, fell, and plaintiff was injured by falling bricks. The banner was erected by third persons, and there was no evidence that defendant or its officers had any knowledge of the manner in which the cable was anchored, and it could not be seen from the street. Held that, in the absence of any local regulation prohibiting it, the banner was a lawful structure, and defendant was not liable because it did not make an inspection to determine the security of the fastenings.—Circuit Court of Appeals, Third Circuit, 218 F. R. 60.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Feb. 9-12.

AMERICAN CONCRETE INSTITUTE.—Convention, Chicago, Ill. Secretary, E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Feb. 9-12.

SECOND NATIONAL CONFERENCE ON CONCRETE ROAD BUILDING.—Chicago. Feb. 9-12, 1915.

EIGHTH CHICAGO CEMENT SHOW.—Coliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

Feb. 11, 12.

OHIO MUNICIPAL LEAGUE.—Fourth Annual Meeting, Columbus. Secretary-treasurer, F. W. Coker, Ohio State University.

Feb. 17-19.

IOWA ENGINEERING SOCIETY.—Annual meeting, Iowa City, Ia.

Feb. 19, 20.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY.—Annual meeting, St. Paul, Minn. Secretary, George H. Herrold, City Hall, St. Paul.

Feb. 19-20.

TECHNOLOGY CLUBS ASSOCIATED.—Third annual convention, Pittsburgh. Secretary, H. A. Rapelye.

Feb. 19-20.

LEAGUE OF WASHINGTON MUNICIPALITIES.—Fifth Annual Convention, Olympia, Wash. Secretary-Treasurer, Dr. Herman D. Brauer, Univ. of Washington, Seattle, Wash.

Feb. 23, 24.

INDIANA SANITARY AND WATER SUPPLY ASSOCIATION.—Eighth annual convention, Hotel Severin, Indianapolis, Ind. Secretary and treasurer, W. F. King, M. D., Asst. State Health Commissioner.

March 11.

VERMONT SOCIETY OF ENGINEERS.—Meeting at Burlington, Vt. Secretary, George A. Reed, Barre, Vt.

March 22-26.

CANADIAN AND INTERNATIONAL GOOD ROADS ASSOCIATION.—Second annual convention, Toronto.

May 10-14, 1915.

AMERICAN WATERWORKS ASSOCIATION.—Annual Convention Cincinnati, O. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 14-16, 1915.

SOUTHWESTERN WATERWORKS ASSOCIATION.—Annual Convention, Galveston, Tex. Secretary, F. L. Fulkerson, Waco, Tex.

Sept. 20-25, 1915.

INTERNATIONAL ENGINEERING CONGRESS.—Am. Soc. C. E., Am. Inst. Min. E., Am. Soc. Mech. E., Am. Inst. E. E. and Soc. N. A. & M. E., San Francisco, Cal. Secretary, W. A. Catell, Foxcroft Building, San Francisco, Cal.

American Road Builders' Association.

George W. Tillson, consulting engineer to the president of the Borough of Brooklyn, New York, N. Y., was elected president of the American Road Builders' Association, which held its regular annual meeting at the Hotel Astor on Friday, Feb. 5. Other executive officers for 1915 were elected as follows: First vice-president, A. W. Dean, chief engineer of the Massachusetts highway commission; second vice-president, Austin B. Fletcher, state highway engineer of California; third vice-president, S. Percy Hooker, state superintendent of highways of New Hampshire; secretary, E. L. Powers, editor Good Roads; treasurer, Major W. W. Crosby, consulting engineer, Baltimore, Md. In addition, the following were elected directors for three years: E. A. Fisher, city engineer of Rochester, N. Y.; A. R. Hirst, state highway engineer of Wisconsin; Joseph W. Hunter, first deputy commissioner, Pennsylvania state highway department; Frank F. Rogers, state highway commissioner of Michigan; William R. Smith, general manager of the Lane Construction Corporation, Meriden,

Conn., and H. M. Waite, city manager of Dayton, O.

Besides the election of officers, business taken up at the meeting included the reception of the annual reports of the secretary, the treasurer and the executive committee. The report of the executive committee showed a very substantial gain in membership during the year and a very satisfactory financial condition. The report also touched upon the eleventh annual convention of the association held at Chicago, Ill., Dec. 14-18, 1914. It was reported that the registration at this convention showed a larger attendance than at any previous meeting of the organization, and it was stated that, in fact, the attendance was believed to have been the largest gathering of those interested in road building ever held. It was also stated that the exhibition of machinery and materials held in conjunction with the convention occupied more space than any other exhibition of the kind.

At the Chicago convention progress reports were made by the association's committee on standards and on legislation, and it was voted that the reports of these two committees be taken up and acted upon at the annual meeting in February. In accordance with this vote, these reports were presented at the meeting on Feb. 5, and it was voted that they be accepted and printed in the annual "Proceedings," for discussion and further action. Both reports were thorough and will be received with great interest in road building circles.

At the close of the business session at the Hotel Astor, the gathering adjourned for dinner at Rector's at 6:30. After dinner the report of the tellers was received, and brief addresses were made by W. A. McLean, the retiring president, who acted as toastmaster; President Tillson; Past-President Jas. H. MacDonald, formerly state highway commissioner of Connecticut; H. M. Swetland, president of the Class Journal Co., New York, N. Y.; William H. Connell, chief of the bureau of highways and street cleaning of Philadelphia, Pa.; R. A. Meeker, state highway engineer of New Jersey, and Frank D. Lyon, secretary of the Inter-State Stone Manufacturers' Association, Columbus, O.

League of Washington Municipalities.

The fifth annual convention of the League of Washington Municipalities, which met in Olympia January 25-27, was the most successful which the league has yet held. The league's finances also are on a better footing than ever before, the report of the treasurer showing a satisfactory cash balance in hand, after paying off last year's deficit and all expenses to date, and without anticipating any dues receivable for the current year. The larger program for the current year,

as outlined by the president and secretary in their annual reports, together with the publication and distribution of the annual proceedings and the league's monthly official paper will require every dollar contributed, and much more besides.

The league has for its headquarters the Bureau of Municipal Research at the State University. By this arrangement it secures without expense to itself all the advantages of a permanent, non-partisan headquarters, in charge of trained workers, and with extensive collections of municipal information already existing on the shelves of the bureau and the various university libraries. The chief of the bureau is secretary and treasurer of the league and municipal editor of its official paper, the Pacific Builder and Engineer. He also conducts its correspondence and keeps its accounts. All the league's officers serve without pay, and running expenses are therefore kept at the lowest possible figure. On the other hand, the university benefits by the inspiration and practical outlook which comes from close touch and personal co-operation with city officials all over the state.

Governor Lister in his address of welcome emphasized the value of accurate accounting, in order to facilitate good business management of municipal affairs, and to enable taxpayers to know exactly what is being done with their money.

Mayor Mottman of Olympia, who welcomed the delegates on behalf of his city, disparaged the policy of "Let posterity pay the bills," and advocated strongly a policy of "Pay as you go." Comparing municipal affairs with his own private business, he declared that if the financial methods existing in the government of some of our cities were applied to his private business he would find himself bankrupt within a few years. "Why should not a city be just as free as any private or corporate business to apply surplus revenues in one department to the payment of temporary deficits in another department, just as any well-managed private business would do? Separate departmental funds in municipal finance should exist only for bookkeeping purposes. Is it not absurd for a city to have surplus money comparatively idle in one of its funds, while some other department which may happen to be temporarily short must pay interest on borrowed money at a rate much higher than the interest earned by its surplus deposits in banks?"

All the papers presented by the various speakers were of exceptional merit, and will appear in the proceedings of the convention, to be shortly published and distributed to all the members of the league. The next convention will be held at North Yakima in October of this year.

The officers of the league for the current year are as follows: President, Howard A. Hanson, assistant corporation counsel, Seattle; vice-presi-

dent, H. M. Stephens, corporation counsel, Spokane; secretary-treasurer, Herman A. Brauer, University of Washington, Seattle. The existing sections and standing committees of the league are continued, and in addition there was organized a section of mayors, commissioners and councilmen with the following officers elected by the convention: Chairman, Dr. Joseph F. Barton, mayor, North Yakima; vice-chairman, J. S. McKee, mayor, Hoquiam; secretary, R. C. Vandevort, councilman, Aberdeen.

Kansas Engineering Society.

The seventh annual meeting of the Kansas Engineering Society was held at Topeka, Kansas, Jan. 19-20, with more than 100 members present. T. G. Strickler was elected president; M. Smith, of Emporia, vice-president, and C. A. Foster, secretary and treasurer. Manhattan, Kansas, was selected as the place for the 1916 meeting.

A highway bill, drafted by the society, will be given the legislature. It proposes a state highway commission of three members, one of whom shall be a member of the school of engineering of the Kansas State University, another from the engineering department of the State Agricultural college. The third member of the commission shall receive ten dollars per day for each day actually employed.

Offices are to be maintained in Topeka. The commission shall have authority to employ, remove, define the duties and fix the salaries of engineers, experts, clerks, stenographers and temporary employees necessary to carry on the work of the office. A chief engineer to be known as the state highway engineer is to be appointed by the commission.

The administration of all road and bridge laws and the general supervision of all roads, bridges and culverts throughout the state and the construction and maintenance of the same will be under the supervision of the commission. It shall be the duty of the commission to disseminate information concerning roads and bridges and their construction to county officers.

A uniform system of auditing and accounting for all road and bridge expenditures is required in the proposed law. The charge of all road, bridge and culvert work is left to the county engineer of each county under the supervision of the state commission. It is made the duty of the county commissioners, the county clerk, and the county engineer and members of the township boards of highway commissioners to furnish detailed information concerning their work, upon the written request and upon the blank form supplied by the commission. The money derived from state automobile licenses is to be diverted from its present uses to the state highway commission.

Among the papers presented were: "Some Features of Sewer Construction in Topeka," E. G. Gibson; "Kansas Highways," A. R. Losh; "City Planning," W. G. McNow; "Some Problems of the Municipal Engineer," L.

R. Ash; "Water Purification," Fred R. Hesser; "The Electrolytic Treatment of Sewage at Durant, Oklahoma," J. E. Welker; "Highway Laws," Prof. H. A. Rice; "Observations on Small Water Works," Cleveland Loper, and "The Value of Pure Water and Sanitation," R. E. McDonnell.

Iowa Engineering Society.

The twenty-seventh annual meeting of the Iowa Engineering Society will be held at Iowa City, Feb. 17-19. Papers will be read covering the use of vertical fibre paving brick, the testing and grading of concrete aggregates, city planning and sanitation. Nelson P. Lewis, chief engineer of the board of estimate and apportionment of New York City, will deliver a address.

American Society of Mechanical Engineers.

At the meeting held February 9, Edwin J. Prindle will present a paper covering a plan for classifying, indexing and digesting the records of the society, which makes it possible to turn instantly to information upon a specific subject, without the necessity for an extended search through the various papers and discussions.

Indiana Engineering Society.

The annual meeting of the Indiana Engineering Society was held at the Hotel Severin, Indianapolis, Ind., Jan. 20-23. The following officers were elected at the closing session: President, E. H. Ahara, Mishawaka; vice-president, U. S. Hanna, Indiana University; trustees, Charles Hurd, Indianapolis; W. J. Schoonover, Plymouth, and Albert Smith, Purdue University. The two holdover trustees, whose terms have not expired, are H. O. Garman, Indianapolis, and L. W. Wallace, of Lafayette. The secretary will be elected by the board.

A resolution was adopted by the society approving the work of the Indiana flood commission, appointed by Governor Ralston, and indorsing the principles of the flood prevention bill introduced in the general assembly by Senator S. R. Fleming. A resolution was adopted indorsing the bill providing for a sewage disposal plant for Indianapolis, and indorsing the proposition that the state board of health should have the power of approval of all plans for sewage disposal projects.

Another resolution urged the passage of the "bill for an act authorizing the formation of corporations for the practice of engineering under the provisions of the voluntary association act of 1910," pending before the present general assembly.

It was decided, by the adoption of a motion, that the officers of the society be empowered to meet and confer with officers of the Indiana Sanitary and Water Supply Association to discuss the question of holding a joint meeting of the two organizations in 1916.

Among the papers presented were "Compensation and Appointment for City Engineers," A. P. Melton; "Design of Concrete Bridges," W. J. Titus; "Results of a Traffic Census at Lafayette, Ind.," G. E. Martin, and "Highway Bridge Floors," W. A. Knapp.

Eighth Cement Show.

Plans for the eighth Chicago cement show have been announced. The show is to take place at the Coliseum from Feb. 8 to 17, inclusive. The floor and balcony area of the building will be taxed this year for room to accommodate the increased list of exhibitors.

Among the events of "cement season" in Chicago will be the annual meeting of the American Concrete Institute in the Auditorium hotel; the sixteenth annual convention of the National Builders' Supply Association, at the Hotel Sherman, Feb. 8 and 9; the American Concrete Pipe Association at the Coliseum Feb. 15 and 16, and gatherings of good roads experts, including state and county officials, from many sections of the country.

State Road Builders' Association of California.

The thirteen superintendents of roads in northern California have formed a society known as the State Road Builders' Association of California, the object of which is to promote efficiency in road building and maintenance and to eliminate politics from road work. The following officers were elected: President, Grant P. Merrill; vice-president, C. M. Baxter; secretary and treasurer, Edward Goodwin.

Illinois Society of Engineers and Surveyors.

The thirtieth annual convention of the Illinois Society of Engineers and Surveyors was held at Springfield, Ill., Jan. 27-29. Over 100 members were present for the three days' meeting.

Urbana was selected as the next place of meeting and the following officers were elected: President, W. S. Shields, of Chicago; vice-president, Paul Hansen, Urbana; trustees, B. H. Piepmeier and H. L. Fixmer, Chicago.

The following papers were presented: "Paving Practice at Springfield," W. D. Seeley; "Burned Shale for Paving in Parks," George L. Haransberger; "Creosoted Wood Block Paving," L. D. Jeffries; "The Design of Pavements," H. L. Fixmer; "A Street Having Only One Gutter," W. G. Kirchhofer; "Vertical Fiber Shallow Brick for Paving," G. E. Johnson; "Integral Curbs for Concrete Pavements," C. M. Powell; "Selection of Deep Well Pumping Machinery," D. A. Graham; "Surveys of Public Lands," A. D. Kidder; "Survey of the Pecatonica River," H. L. Alger; "The Sewer System of Alton, Illinois," J. E. Schwaab; "Water Supplies of Illinois," P. Hansen and R. Hilscher; "Economics of Brick and Concrete for Roads," H. E. Bilger; "Brick Paving for Rural Highways," R. L. Bell; "Concrete Road at Marquette Hill," B. H. Piepmeier; "Common Defects in Concrete Road Construction," A. H. Hunter; "Pipe Culverts for Roads," Benjamin Brooks; "Effect of Dry Weather on Macadam Roads," Benjamin Jordan; "The Little River Drainage District," W. A. O'Brien; "The South Quincy Levee District," Edmund T. Perkins; "Bell-End Pipe for Land Drainage," J. M. Egan;

"Drainage Pumping Plants," W. C. Maddox; "Interior Drainage of Levee Districts," H. C. Haungs; "Estimating Curves for Highway Bridges," C. F. Burch; "The Testing Laboratory at Lewis Institute," D. A. Abrams.

Ohio Municipal League.

The fourth annual meeting of the Ohio Municipal League will be held in Columbus, O., Feb. 11-12. Dr. Washington Gladden is president and F. W. Coker, secretary and treasurer of the league. The discussion will be mainly on taxation propositions.

Speakers have been secured to present the subject of taxation in its various phases. It is expected that Governor Willis will be present and speak. Louis J. Tabor, of Belmont County, Master of the Ohio Grange, will discuss "Taxation and the Farmer." Ex-Senator William Green, Secretary-Treasurer of the United Mineworkers of America, will discuss "Taxation and Labor."

John Z. White, of Chicago, a noted single taxer, will talk on "Taxation of Land Values." Prof. H. L. Lutz, of Oberlin, will discuss "Taxation of Corporations." These addresses will be given on the opening day. The second day State Auditor A. V. Donahey will talk on "The Financial Needs of the State"; Henry G. Williams, supervisor of Normal Schools, will speak on "The Financial Condition of the Schools" and Special Counsel Clarence D. Laylin, of the Attorney General's office, will talk on "The Apportionment of Revenue and Expenditure Between State and Local Government." Stewart L. Tatum, of Springfield, Chairman of the Commission to Investigate Municipal Revenues, will discuss "The Financial Condition of Cities," and Mayor Newton D. Baker, of Cleveland, on "Home Rule in Taxation." Lawson Purdy, President of the Department of Taxes and Assessments of New York, will discuss "The Constitutional Limitations Upon the Taxing Power."

Arkansas County Judges' Association.

The Arkansas County Judges' Association met at Little Rock, Jan. 27. Most of the time of the meeting was devoted to preparing legislation to be presented to the legislature at its next meeting. Among the measures endorsed was one making it legal to award bridge contracts, other than publicly. Another dealt with the matter of enforcing upon counties the decisions of the state highway engineer in regard to bridge and highway work. Officers were elected as follows: President, E. D. McCall; vice-president, J. M. Thomas; secretary, Harry E. Cook.

Montana Institute of Municipal Engineers.

The third annual meeting of the Montana Institute of Municipal Engineers was held at Helena, Mont., Jan. 18-20. Billings, Mont., was chosen as the next place of meeting and the following officers were elected: Clyde E.

Durland, Billings, president; C. W. Helmick, Helena, vice-president; C. C. Widener, Bozeman, secretary and treasurer; W. L. Morris, Great Falls, and F. C. Snow, Bozeman, directors. Papers presented included: "Publicity and the City Engineer," Henry Gerharz; "Force Account or Contract in Municipal Work," W. J. Flood; "Is the City Manager or Commission Form of Government Suitable in Montana Cities?" C. W. Helmick; "Suggestions for Betterment in Marketing Municipal Securities," M. L. Morris; "Improvement District Law in Actual Practice," A. L. Jacqueth; "Objects and Use of Testing Bitumens for Paving," W. B. Vestal, Jr.; "Present Status of Pollution of Waterways in Montana," Prof. W. M. Cobleigh; "The Experimental Sewage Plant at Bozeman," Carl C. Widener.

PERSONALS

The following officials have been appointed:

Camden, N. J.—Finance—Gemberling, Deacon, Hall, Bender, Kirk, Reader, Geissler, Middleton, Van Hart; water—C. H. Greer, Van Hart, Carney, Deacon, Read, Reader, Middleton, Kirk, Heimach; fire—Read, Jones, Schneider, Mills, Hall, Bender, C. H. Greer, Middleton, Carney; lighting—Carney, C. H. Greer, Middleton, Hall, Read, Jones, Schneider, Kirk, Bender, Corson, Geissler, Gemberling, Tretbar; streets—Sparks, Mills, Tretbar, Van Horn, Corson, Macintosh, Jones, Bowen, Pettit; police—Deacon, Gemberling, Read, C. H. Greer, Sparks, Geissler, Ivers, Kirk, Helm; electrical—Jones, Read, Schneider, Carney, Geissler, J. O. Grear, Macintosh, Reader, Corson; wharves and docks—Van Hart, Pettit, Deacon, Carney, C. H. Greer, Heimach, Reader, Jones, Bowen.

Middletown, N. Y.—Ways and means—Rackett, DuVall, Babcock, Buck; streets, sewers and sidewalks—Babcock, DuVall, Buck, Rackett.

Hood River, Ore.—Marshal, J. K. Carson; city engineer and superintendent of water department, P. M. Morse; city attorney, George R. Wilbur; health officer, Dr. Jesse Edgington; street commissioner, T. B. Chambers. All are reappointments.

Camas, Wash.—Mayor, Hugh MacMaster; clerk, F. B. Barnes; treasurer, O. F. Johnson; attorney, J. D. Currie; councilmen: C. E. Farrell, J. S. McAllister, W. E. Farr, R. J. Blair, John Gittings, Irwin Copley and B. M. Faler; health officer, Dr. R. W. Armstrong.

Rock Hill, S. C.—J. Hardin, mayor.

Attleboro, Mass.—Park commissioners: John Anderson (for three years), Charles A. Moors (for two years, and Solon E. Bushee (for one year); city physician, Dr. W. E. Rounseville.

Athens, Ga.—Jerome Michael, city attorney; W. L. Wood, clerk and treasurer; B. F. Woods, city marshal; J. W. Barnett, city engineer; James

Barrow, superintendent of waterworks; E. S. Price, city recorder; G. A. Mell, auditor; L. E. Brooks, chief of police; G. W. McDorman, chief fire department; finance, Messrs. Tibbetts, Hinton, and Gordon; streets, Messrs. Dudley, Palmer and Hoke; police, Messrs. Gordon, Dudley and Hinton; fire department, Messrs. Hinton, Hoke and Dudley; light, Messrs. Mathews, Tibbetts and Palmer; sewers, Messrs. Palmer, Hoke and Mathews.

Holyoke, Mass.—Fire commissioner, Charles U. Roy; board of health, Dr. W. J. Powers; city marshal, John R. Harrington; manager gas and electric department, John J. Kirkpatrick; city solicitor, T. C. Maher; board of public works, James A. Allen; inspector of public buildings, Frank O'Connell; secretary to the mayor, John A. Cronin; committees: Finance, Laporte, Griffin and McMahon; municipal lighting, Shea, Sweeney, Stalker, Dowd and Hamel; river navigation, Childs, Bleasius, Thorpe, Archambault and Long.

Gloucester, Mass.—City auditor for three years, Daniel O. Marshall; city treasurer, Edward Dolliver; city solicitor, John J. Cunningham; collector of taxes, Richard L. Morey; city engineer, John H. Griffin; superintendent of highways, Austin Shackleford.

Pittsfield, Mass.—City physician, D. H. H. Bard; city treasurer, Frederick M. Platt; city solicitor, John J. Wittlesey; member of board of public works for three years, Eugene H. Robbins; member of board of health for three years, Attorney J. Arthur Baker; sinking fund commissioner for three years, Ralph B. Bardwell; city auditor, Edgar T. Lawrence.

Springfield, Mass.—City auditor, William G. McIntyre; city solicitor, Charles H. Beckwith; city prosecutor, Josiah Dearborn; finance committee, Alderman Franklin, Councilmen Cowles and Shaw (also the mayor and president of the common council); city property, Aldermen Martens and Hare, Councilmen Lanclaux, Morrill and Grady; fire department, Aldermen Cook and Haskell, Councilmen Foster, Griffin and Sanderson.

West Long Branch, N. J.—Solicitor, William A. Stevens; engineer, J. Wesley Seaman; recorder, A. R. Chinery.

Vancouver, Wash.—Purchasing, Steel, Percival and Smith; water, Wineberg, Engleman and Padden; electric lights, Percival, Steel and Mackey; fire department, Padden, Percival and Mackey; streets, public buildings and improvements, Engleman, Percival and Smith; health and police, Mackey, Percival and Wineberg.

Rahway, N. J.—Fire and water, Gage, Gunn and McCoy; finance, Gunn, Buckley and Laidlaw; lamps and police, Buckley, Page and Morton; building, Buckley, Gunn and Englehart; streets, Gunn, Schaefer and Englehart; members of the sanitary commission, Dr. J. T. Brickell, Dr. W. H. Madison, H. S. Buckley, George M. Gage, Arthur R. Wendell, W. A. Ransom and Mayor Fyffe.

NEW APPLIANCES

MERCURY BULLEY TRACTOR With Mercury Snow Plow and Sweeper.

Mercury Tractor.

The development of snow-cleaning by motor-driven apparatus has been somewhat handicapped by the lack of a suitable power unit—sturdily built, easily manipulated, capable of securing traction on any kind of snow or ice-covered street without injury to the pavement and of sufficient power to break up frozen drifts. For two years the Bulley tractor has been built in both three and four-wheel types. This machine is designed to exert a straight drawbar pull like that of a locomotive without carrying any part of its loads and at the same time having the ability to get behind and push with equal force. The tractor has proved successful in handling long trains of trailers, pulling street sweepers, snow drags, snow scrapers and for pushing snow plows. The machine operates at speeds up to eight miles an hour.

Mercury Snow Plow.

The Mercury Snow Plow differs from the usual street plow and resembles more the railroad plow. In the ordinary road scraper there is a single blade set at an angle, slightly curved and rigidly attached to the vehicle, but capable of vertical adjustment by the operator—in some cases a change of angle is also possible. The Mercury plow differs in that it is flexibly attached to the power unit, rests on its own wheels and is free to conform with the pavement surface, regardless of the position the tractor may assume. The principal feature of the plow is therefore the method of attachment to the tractor and the unique self-steering control. The plowing unit may be attached ready for use in ten minutes and detached in five, leaving the tractor free for its regular

hauling duties. The unit consists of a V-shaped main member properly designed to lift and displace the snow, and an arm eight feet long attached to the right-hand rear of the V-shaped piece and easily adjustable so as to decrease or increase the throw of the plow. The rear ends of the main member are supported on two caster wheels and the front on a flanged grinding wheel mounted on a fork and turned by a gear and wheel arrangement directly attached to the tractor steering turntable. The framework is of heavy channel and angle iron, riveted and welded together. The heavy bent plates forming the blades are riveted in place and reinforced by channel iron ribs and angle iron lengthwise members. There is less than half an inch of clearance between the plow and the ground. The V end is fitted with a strong prow so that when an obstacle is met which cannot be plowed aside the plow either mounts over it or sheers to one side. The plow is attached to the tractor at three points, but none of the connections are rigid.

The extra plowing arm may be attached to the rear end of the right side of the plow by a long swivel belt. The rear end of the arm is supported on a caster wheel and connected with the back of the tractor by a braced, telescopic extension rod. The length of the rod can be quickly adjusted to give the extra arm any throw up to six feet. The Mercury Bulley tractor equipped with the snow plow gave excellent service after the snowfalls of last Dec. 28 and Jan. 20 in Chicago. It "rammed" snow banks and widened frozen cuts. On the second occasion two tractors, one carrying a Mercury plow and the other a snow sweeper, worked on Michigan avenue.

The apparatus is made by the Mercury Manufacturing Co., 4110 South

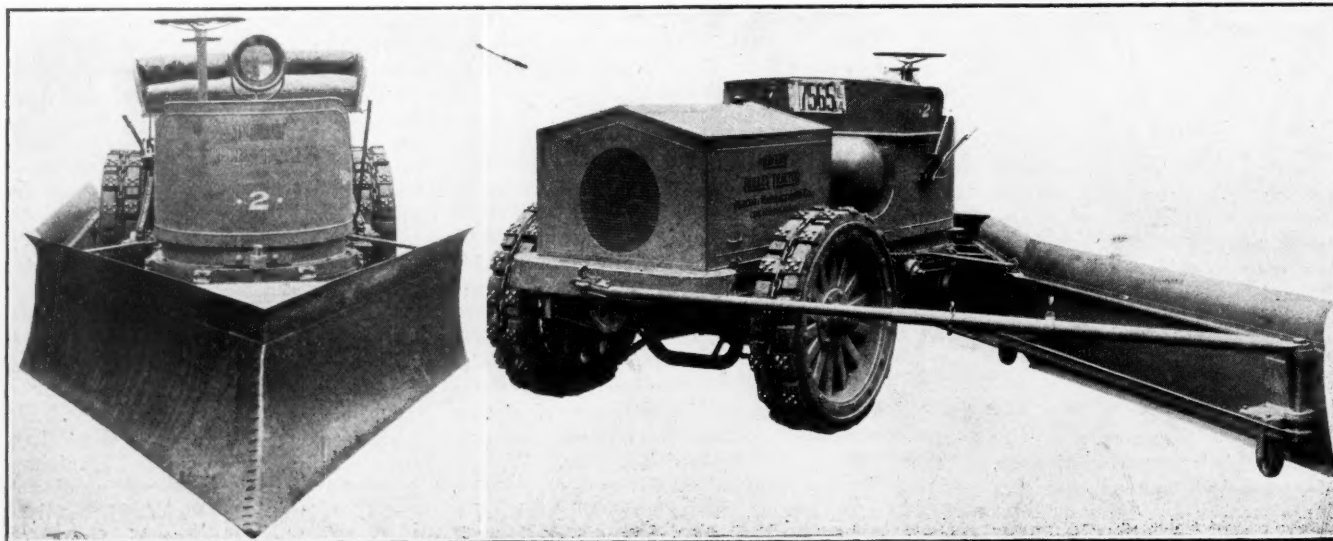
Halsted street, Chicago. The plow is shown in the illustration on this page and the sweeper is shown in action on the following page.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—At Cincinnati the award of 1,400 tons of high pressure pipe has been made to the U. S. Cast Iron Pipe & Foundry Co., and at Kalamazoo the Lynchburg Foundry Co. will supply 400 tons. Prospective lettings for the near future include 4,250 tons at Portland, Ore., and several small lots of from 100 to 200 tons at Appleton, Wis., Redford, Mich., and Anna, Ill. Quotations: 4-inch, \$25.50; 6 to 12-inch, \$23.50; 16-inch and up, \$23. Birmingham—Pipe shops in this district have been successful bidders on a number of contracts. Quotations: 4-inch, \$20; 6-inch and up, \$18. New York—No new municipal lettings of importance in sight. Quotations: 6-inch, \$20 to \$20.50.

Lead.—Quotations: New York, \$3.80; St. Louis, \$3.625.

The Universal Portland Cement Co., Chicago and Pittsburgh, announces the resignation of Edward M. Hagar as president. Mr. Hagar has been the head of this cement business for fifteen years and manufactured the first barrel in May, 1900. The company has been conspicuously successful, as shown by the growth of its business from 32,000 barrels produced in 1900 to its present capacity of approximately 12,000,000 barrels per year. For several years the Universal Portland Cement Company claims to have been the largest shipper of Portland cement in the world. Mr. Hagar was for two years president of the Association of American Portland Cement Manufac-



MERCURY BULLEY TRACTOR AND MERCURY SNOW PLOW.

turers and has been an important factor in the promotion and development of the use of cement in building construction of all kinds. He also founded the Cement Products Exhibition Co. in 1907. This company conducts the annual cement shows, which are recognized as among the most important industrial exhibitions held annually in the United States. Mr. Hagar retires to assume the presidency of a new company which he is forming to acquire a chain of Portland cement plants covering a large part of the United States. The headquarters of the new company will be in Chicago.

B. F. Affleck has been elected president to succeed Mr. Hagar. Mr. Affleck entered the service of the Illinois Steel Co. in 1896 and from 1901 to 1903 represented the cement department of the company in the St. Louis territory. When the Universal Portland Cement Co., a subsidiary of the United States Steel Corporation, was incorporated in 1906 to take over the cement business of the Illinois Steel Co., he became general sales agent. He is vice-president of the Cement Products Exhibition Co. and is recognized as a pioneer in promoting the use of concrete as a paving material.

The Terry Steam Turbine Co., Hartford, Conn., has issued for general distribution a neat new 64-page bulletin "Centrifugal Pumps." The principles of operation and construction of the centrifugal pump are clearly explained with very useful illustrations. The uses of turbine driven centrifugal pumps are interestingly discussed. The principles of design and operation of the steam turbines used for driving them are explained. Condenser turbines, boiler feed pumps, high duty pumps for waterworks service, contractors' pumps and vertical pump sets are among the other machines described and illustrated.

The Buffalo Meter Co., Buffalo, N. Y., makers of the well-known "American" and "Niagara" water meters, have just published a new bulletin on "Water Meter Rates and Regulations." This valuable book explains very clearly and practically the method of determining a meter rate and the consideration of all the factors involved. The four methods most widely used are carefully explained. In addition the rates of 709 water works are given. The Buffalo Meter Co. offers to any water-

works official who will fill out a chart a recommendation of the meter rate suitable for his problem. This useful book and chart are for free distribution.

The United States Cast Iron Pipe & Foundry Co., with general offices at Burlington, N. J., has just published a remarkably valuable pipe catalogue. It should be in the library of every user of pipe or large iron castings, and water works officials, contractors, city officials and engineers will find it perhaps the most useful and valuable publication of its kind. Certainly its dignified sumptuousness will make its readers want to keep it. The history of cast iron pipe is interestingly told and illustrated and then follow expositions of types of joints, high pressure fire systems, submerged pipe, protection of mains and jointing materials. The tables of dimensions and weights include in addition to standard bell and spigot pipe and fittings made to the American water works specifications, a corresponding line of flanged fittings. The company's new line of bell and spigot pipe and fittings for high pressure, with a double groove in both bell and spigot, is also tabulated. Special castings of many varieties and sizes are shown. Useful tables of general information on "Flow of Water in Cast Iron Pipe," "Friction Heads for Elbows," "Commercial Pipe Sizes for Fire Streams," "Contents of Pipe," "Contents of Tanks and Cisterns per Foot of Depth," "Relative Delivery of Water," Conversion Tables of Head in Feet to Pressure in Pounds per Square Inch, and others complete the volume. The book is free to any bona fide user of pipe or large castings who applies to the Publicity Department Desk 7, of the U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.

The Willys-Overland Company, Toledo, O., has disposed of its interests in the plant of the Gramm Motor Truck Company, Lima, O., and will discontinue the manufacture of motor trucks and devote its entire attention to making passenger automobiles. The motor truck department of the Garford Motor Truck Company, Elyria, O., which has been under the Willys-Overland control, will be transferred to the Lima plant. The Willys-Overland Company will continue to operate the Garford plant in Elyria. E. A. Williams, Jr., will be president and general manager of the Gramm Motor Truck Company; Joseph B. Immler, vice-president and treasurer, and A. Stull, secretary.

New York State Civil Service Commission.

February 27, 1915.

Open competitive examinations for the state, county and village service will be held in various cities throughout the state February 27, 1915, for the positions below. Appointments to positions in the county and village service will be made when practicable from the general eligible lists, residents of the county or village being preferred for such appointments.

Junior Assistant, Engineering Departments. \$901 to \$1,200. Minimum age, 20 years. Subjects of examination and relative weights: Problems in applied mechanics and mathematics, including surveying, elementary structures and hydraulics; questions on surveying and construction practice, and on materials of construction, 3; experience, education and personal qualifications, 2. Open to non-residents.

Chainman. Minimum age, 18 years. \$2.50 to \$3.00 a day. The nature of the examination will require some practical experience in engineering work. Subjects of examination and relative weights: Questions covering arithmetic, elementary algebra, use of the minor surveying instruments and elementary engineering construction, 7; education and experience, 3.

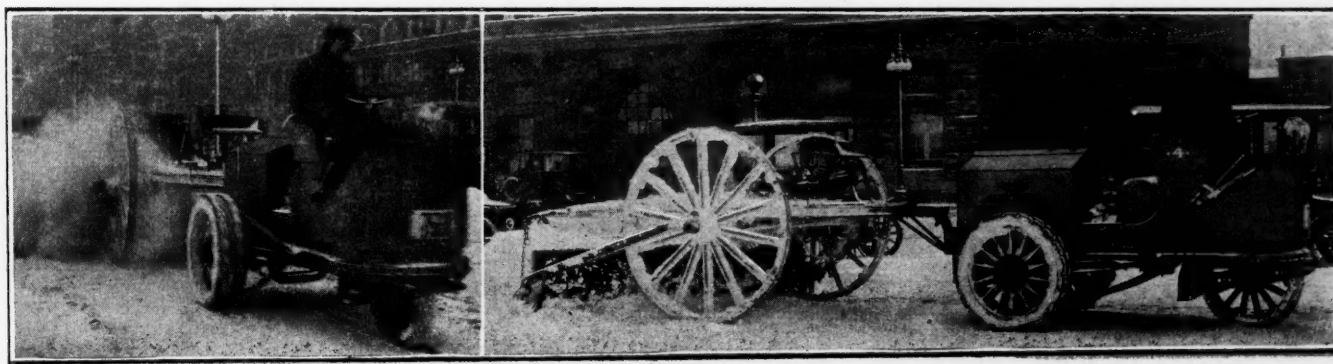
Director, Division of Communicable Diseases, State Department of Health. \$4,000.

Director, Division of Public Health Nursing, State Department of Health. \$2,500.

Persons interested in the last two examinations should write to the State Civil Service Commission, Albany, N. Y., for a special circular of information.

Inspector of Construction, Greene County. \$3.50 to \$4.50 per day. Applicants must be in good physical condition, able-bodied and fit for out-door duties involving exposure, and must have had practical experience in the building of roads, or of other public or private works, either in construction or maintenance. Subjects of examination and relative weights: Practical questions on the construction of roads under the various methods employed, including the preparation and placing of concrete, inspection of materials and work, 1; experience and personal qualifications, 1.

Applications must be received in the office of the commission on or before Feb. 19. No application blanks will be sent out by mail after Feb. 17.



MERCURY BULLEY TRACTOR AND SNOW SWEEPER.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
O.	La Grange	Noon, Feb. 13.	Repairing with slag and asphalt binder	Village Council.
O.	East Youngstown	Noon, Feb. 15.	Grading and guttering streets	C. R. Anderson, Vil. Clk.
N. Y.	Oneonta	Feb. 15.	37,000 yds. bituminous macadam	F. Gurney, City Engineer.
Colo.	Pueblo	10 a.m., Feb. 15.	Street paving	J. M. Jackson, City Clk.
Ia.	Emmetsburg	2 p.m., Feb. 15.	40,000 sq. yds. Bitulithic, Sarcolithic, mineral rubber, asphaltic concrete, vit. brick, creosoted wood block or Portland cement concrete	City Clerk.
Ia.	Marshalltown	Feb. 15.	Paving	City Clerk.
Mich.	Benton Harbor	Feb. 15.	Brick paving, cost \$17,000.	B. Spaulding, City Clerk.
Minn.	St. Paul	10 a.m., Feb. 15.	Grading and improving streets	Aug. Hohenstein, Pur. Agt.
Ind.	Indianapolis	10 a.m., Feb. 15.	Curbing and paving, three jobs	Board of Public Works.
Ind.	Hammond	10 a.m., Feb. 15.	Cement curb and sidewalk and catch basin construction	Board Public Works.
O.	Cleveland Heights	Noon, Feb. 15.	Improving section of Exeter road	H. H. Canfield, Vil. Clerk.
Conn.	Willimantic	Feb. 15.	Repairing town highways	Town Clerk
Ia.	Iowa Falls	Feb. 15.	51,500 yds. asphaltic or brick paving	City Clerk.
Md.	Baltimore	Noon, Feb. 16.	Stone chips for resurfacing road	State Roads Commission
Ia.	West Liberty	Feb. 16.	40,000 yds. paving, 20,000 ft. curb and gutter	D. R. Anderson, Engr.
N. J.	South Orange	8 p.m., Feb. 16.	3,200 tons of broken stone and screenings	Edw. R. Arcularius, Twp. Clk.
O.	Cleveland	Noon, Feb. 16.	Creosoted wood paving blocks	A. R. Callow, Comr. P. & Sup.
Md.	Baltimore	Noon, Feb. 16.	Five sections, 12.52 miles state highway	State Roads Commission.
O.	Cleveland Heights	Feb. 16.	Street improvement and paving	H. H. Canfield, Clerk.
O.	Toledo	10 a.m., Feb. 16.	Bituminous paving	Board of County Comrs.
O.	Shaker Heights	Noon, Feb. 16.	Paving with brick, concrete or asphalt	C. A. Palmer, 1st Nat. Bank, Cleveland.
Ia.	Belle Plaine	3 p.m., Feb. 16.	32,500 yds. concrete or asphaltic pavement	C. E. Greenlee, City Clk.
Ia.	Cedar Falls	7.30 p.m., Feb. 16.	Paving and improving streets	City Clerk.
O.	Paulding	2 p.m., Feb. 16.	Macadamizing five roads	Board of County Comrs.
O.	Cleveland	Noon, Feb. 17.	Grading, curbing and paving with brick	A. R. Callow, Comr. P. & Sup.
N. Y.	New York	10.30 a.m., Feb. 17.	Repairing asphalt block pavement and setting curb	D. Mathewson, Pres. Bronx.
N. Y.	Brooklyn	11 a.m., Feb. 17.	Regulating, grading, curbing and laying sidewalk	L. H. Pounds, Pres. Boro.
O.	Troy	Noon, Feb. 17.	Grading, constructing cement curb and gutter and paving with brick	Henry J. Beck, Dir. P. S.
O.	Cleveland	Noon, Feb. 19.	400 tons asphaltic cement	A. R. Callow, Comr. P. & Sup.
Pa.	Philadelphia	3 p.m., Feb. 19.	Board walk	Lighthouse Inspector.
Wash.	Seattle	Feb. 19.	46,000 yds. brick paving and 24,000 ft. concrete curb	Board of Works.
O.	Youngstown	Noon, Feb. 19.	Street paving	City Engineer.
N. C.	Wilmington	Feb. 20.	7 1/2 miles of clay-gravel road	L. W. Moore, Co. Comr.
Mich.	Dundee	Feb. 23.	6,700 yds. paving; 2,700 cu. yds. grading	Bd. Village Trustees.
Wash.	Spokane	Feb. 23.	140,000 yds. asphalt macadam	County Commissioners.
O.	Ottawa	1 p.m., Feb. 24.	Macadamizing two roads	Ed. McGaharan, Aud. Putnam Co.
O.	Canton	Feb. 24.	10.5 miles road work, includes 64,857 cu. yds. excavation, 58,885 yds. bit. macadam paving, 31,410 yds. brick paving and 37,692 ft. curb	County Comrs.
O.	Upper Sandusky	Mar. 1.	Fifteen miles water bound macadam	J. Megurat, Aud., Wyandot Co.
Pa.	Wilkes-Barre	Mar. 2.	40,000 gallons road oil	City Clerk.
Ind.	Petersburg	2 p.m., Mar. 2.	Stone road construction	Comrs. of Pike County.
N. Y.	Watertown	Mar. 5.	Wood or brick paving	City Clerk.
Ill.	Joliet	Mar. 6.	Oil spreader tank truck and other machinery	A. J. Lingren, Twn. Clerk.
Fla.	Jacksonville	8 p.m., Mar. 8.	About 400 yds. penetration pavement	Committee on Public Works.
Pa.	Wilkes-Barre	Mar. 12.	Paving with asphalt, brick, etc.	City Clerk.
SEWERAGE.				
Minn.	Blue Earth	9 a.m., Feb. 13.	Drainage ditch construction	H. C. Kolte, Co. Aud.
Pa.	Philadelphia	Noon, Feb. 14.	Brick sewer 10 ft. in diameter	M. L. Cook, Director.
O.	East Youngstown	Feb. 15.	Furnishing material and constructing sewers	C. R. Anderson, Village Clk.
Minn.	Walker	10.30 a.m., Feb. 15.	Drainage ditch construction	C. E. Bacon, Co. Aud.
Ia.	Dows	2 p.m., Feb. 15.	Constructing tile drain	J. J. Johnson & Co.
Ind.	Indianapolis	Feb. 15.	Main sewer construction	G. A. Brown, Engineer.
N. J.	Ventnor City	8 p.m., Feb. 15.	Laying sewer, installing pump and building disposal plant	President of Council.
Ind.	Hammond	10 a.m., Feb. 15.	15-inch sewer pipe	Board Public Works.
N. J.	Camden	8 p.m., Feb. 15.	Repairing sewers	A. Benj. Sparks, Chr. Comm. Sts. & Highways.
D. C.	Washington	Feb. 15.	3,500 ft. 6.5 to 7-ft. trunk sewers	District Comrs.
Mo.	Springfield	Feb. 16.	Sewer construction in District No. 30	City Clerk.
Kan.	Eldorado	6 p.m., Feb. 16.	Sewage purification plant	B. F. Allenbach, City Clerk.
O.	Shaker Heights	Noon, Feb. 16.	Storm and sanitary sewers	C. A. Palmer, 1st Nat. Bank, Cleveland.
Ont.	Toronto	noon, Feb. 16.	Refuse incinerating plant	H. C. Hocken, Mayor.
Minn.	Buffalo	2 p.m., Feb. 16.	Drainage ditch construction	John A. Berg, Co. Aud.
Minn.	Olivia	10 a.m., Feb. 16.	Tile ditch	J. L. Johnson, Co. Aud.
R. I.	Warren	2 p.m., Feb. 16.	15,000 ft. 6 to 18 in. sewer pipe, sedimentation tank, wells, etc.	Wm. H. Smith, Sec. Sewer Comm.
Ia.	Estherville	Feb. 17.	Placing tile in open ditch	Board of Supervisors.
Minn.	Ortonville	3.30 p.m., Feb. 17.	Digging and constructing ditch	A. G. Shogren, Co. Aud.
Wis.	Oconomowoc	1 p.m., Feb. 17.	3,900 ft. 8-in. sewer and 8 manholes	Board Public Works.
N. Y.	Brooklyn	11 a.m., Feb. 17.	Constructing sewer plant to remove suspended matter from sewage at 26th Ward disposal plant	L. H. Pounds, Boro. Pres.
Fla.	Clearwater	Feb. 17.	Sewerage system	J. R. Jeffords, Mayor.
O.	Troy	Noon, Feb. 17.	1,880 ft. sewer pipe construction	H. J. Beck, Dir. P. S.
O.	Cleveland	Noon, Feb. 18.	Sewers, sewer connections and overflows	A. R. Callow, Comr. P. & Sup.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mo.	Medina	11 a.m., Feb. 18	Drainage ditch	County Auditor.
O.	Youngstown	Noon, Feb. 19	Sewer construction	City Engineer.
Ind.	South Bend	Feb. 23	12 to 18-inch vitrified pipe sewer	A. P. Perley, City Clk.
Pa.	Philadelphia	Feb. 23	Sewer construction	Director, Dept. City Transit.
Wis.	Milwaukee	Feb. 24	Constructing intercepting sewer	J. H. Fowles, Sec. Sewerage Comm.
Utah	Payson City	2 p.m., Feb. 24	Drainage ditch construction	U. S. Reclamation Serv., Provo
Md.	Baltimore	11 a.m., Feb. 24	About \$4,000 sewer construction	Sewerage Commission.
O.	Defiance	Feb. 25	Open and tile ditch construction	R. Daoust, Aud. Defiance Co.
Pa.	Philadelphia	Feb. 26	Sewer construction for subway	A. M. Taylor, Dir. City Transit
Minn.	Dumont	8 p.m., Feb. 26	1,400 ft. sewer construction	J. R. Heidelberger, Vil. Rec.
O.	Upper Sandusky	Mar. 1	Ten ditches 40,000 ft. long, 8 to 24-inch tile	J. Megurat, Aud. Wyandotte Co.
Pa.	Philadelphia	Mar. 1	Sewer construction for subway	A. M. Taylor, Dir. City Transit
Mo.	Springfield	Mar. 2	Construction of two district sewers, to cost about \$12,000	Sam Fisher, City Engineer.
S. D.	Sisseton	2 p.m., Mar. 2	Six miles of sewers and sewage treatment plant	City Clerk.
Pa.	Philadelphia	Mar. 3	Sewer construction for subway	A. M. Taylor, Dir. City Transit
Pa.	Philadelphia	Mar. 5	Sewer construction for subway	A. M. Taylor, Dir. City Transit

WATER SUPPLY.

N. J.	Margate City	Feb. 14	Triplex pump, centrifugal pump, gas engines and oil engines	A. B. Repetto, City Clk.
Mich.	Ann Arbor	7 p.m., Feb. 15	Digging well 16 ft. in diameter and 23 ft. deep	Manly Osgood, City Engr.
Va.	Gordonsville	Feb. 15	Enlarging reservoir	L. T. Sneed, Sec. City Trustees
Fla.	Tampa	Noon, Feb. 15	Reinforced concrete reservoir	Tampa Water Works Co.
Mich.	Orion	Feb. 15	Water works	City Clerk.
N. Y.	Mt. Morris	Feb. 15	Water distributing system	Board of Trustees.
O.	Shaker Heights	Noon, Feb. 16	8-inch water main construction	C. A. Palmer, 1st Nat. Bank, Cleveland.
Wis.	Oconomowoc	1 p.m., Feb. 17	2,200 ft. 4-in. water main	Board Public Works.
Fla.	Clearwater	Feb. 17	6,500 ft. c. i. mains and specials	A. J. Brandon, Sup. Pub. Wks.
Md.	Baltimore	11 a.m., Feb. 17	Two Venturi meters	City Register.
O.	Youngstown	Noon, Feb. 18	1,000 tons c-i. pipe, 50 tons specials, 150 gate valves	Director Public Service.
Ill.	Quincy	Feb. 19	Erection and equipment of pumping station	E. T. Perkins Eng. Co., 1st Natl Bk. Bldg., Chicago.
N. Y.	Middletown	4 p.m., Feb. 20	Laying 6,000 ft. 20-in. water pipe	J. T. Degnan, Comr. P. Safety.
Wyo.	Laramie	Feb. 23	Cast-iron pipe; also steel, wood stave and concrete	G. E. Severson, City Engineer.
O.	Cleveland	Noon, Feb. 24	Construction of filtration plant	A. R. Callow, Comr. P. & Sup.
O.	Toledo	Noon, Feb. 25	Laying 24-in. c. i. water main across Maumee River	A. W. Boardman, Dir. P. Serv.
Ill.	Chicago	11 a.m., Feb. 25	5,000 3/4 to 2-inch water meters	L. E. McGann, Comr. P. S.
Mass.	Fitchburg	Mar. 2	Constructing Ashby reservoir (re-advertisement)	Board Water Comrs.
O.	Euclid	Noon, Mar. 8	Laying 10-inch water mains	H. S. Dunlop, Vil. Clk.
Cal.	Los Angeles	4 p.m., Mar. 9	Water meters	Department Public Service.
B. C.	Saanich	Noon, Mar. 12	Cast iron pipe, specials, valves & hydrants	H. S. Cowper, Clerk Municipal Council
Greece	Athens	Mar. 30	Water supply for Athens and additional cities, estimated cost, \$14,000,000	Bur. of Foreign & Domestic Commerce, Wash., D. C.

LIGHTING AND POWER.

N. J.	Butler	8 p.m., Feb. 15	Municipal electric light plant	D. D. Smithyman, Boro. Clk.
Kan.	Pratt	Feb. 15	Electric light plant and water works	E. F. Jones, City Clk.
Md.	Baltimore	11 a.m., Feb. 17	Vitrified tile conduit and special duct pipe	Richard Guinn, City Register.
Md.	Baltimore	11 a.m., Feb. 17	Alterations and repairs to city jail power plant	C. E. Stubbs, Inspector Bldgs.
Okla.	Oklahoma City	10 a.m., Feb. 25	Electrical equipment for state capitol construction	State Capitol Commission.
S. D.	Watertown	Mar. 1	Dam across the outlet of Lake Kameska	Codington Co. Comms.
N. D.	Grand Forks	5 p.m., Mar. 1	Laying underground wires and installing street lighting posts	W. H. Alexander, City Aud.
Ind.	Garrett	8 p.m., Mar. 4	Generator for lighting plant	City Clerk.

FIRE EQUIPMENT.

Conn.	Stamford	Feb. 13	1,500 feet hose	Committee of Fire Dept.
Ill.	Chicago	11 a.m., Feb. 13	Rubber tires for fire department	Thomas O'Connor, Fire Marsh.
N. J.	Union Hill	Feb. 15	Motor pump chemical and hose car	Emil Bautz, Town Clk.
Ind.	Kokomo	10 a.m., Feb. 15	Combination pumping engine, city combination and chief's car	Ben Haven, City Clerk.
Va.	Portsmouth	Noon, Feb. 15	1,500 ft. hose	City Clerk.
Pa.	Philadelphia	Noon, Feb. 16	Construction of fire house	Geo. D. Porter, Dir. P. S.
O.	Youngstown	Noon, Feb. 18	80 fire hydrants	Director Public Service.
N. J.	Paterson	8 p.m., Feb. 19	Two 3-ton chemical combination with hose	Bd. Fire & Police Comrs.
Ill.	Aurora	2:30 p.m., Feb. 20	Combination hose and chemical	Committee on Fire.
D. C.	Washington	2 p.m., Feb. 23	15,000 ft. 2 1/2-inch hose	District Commissioners.
Pa.	Wilkes-Barre	Feb. 26	Tractors, motor combinations and combination pump and hose cars	Fred H. Gates, City Clk.
Mont.	Livingston	Mar. 1	Motor combination chemical and hose	N. E. Entriiken, City Clk.

BRIDGES.

Ont.	Kerwood	Feb. 13	Construction of a steel bridge	H. Thompson, Twp. Clk.
Man.	Winnipeg	Feb. 15	Two-span steel bridge over Lee River	Secy., Board Control.
Wis.	Milwaukee	Feb. 15	Steel span steel trestle	Board of Park Comrs.
N. D.	Dickinson	Feb. 15	Metal culverts and steel frames for bridges	J. I. Hughes, Co. Aud.
Ill.	Urbana	Feb. 15	Three span 240-ft. concrete bridge	G. C. Fairclo, Engineer.
O.	Mansfield	Noon, Feb. 16	Construction of Black bridge	John A. Dalton, Aud., Richland Co.
S. D.	Vermillion	10 a.m., Feb. 16	Bridge construction for one year	J. T. Olson, Aud. Clay Co.
Va.	Bedford City	Noon, Feb. 16	Bridge over Elk Creek	Clerk of Circuit Court
Neb.	Nebraska City	Noon, Feb. 16	Bridge construction during 1915	County Clerk
Minn.	Mora	2 p.m., Feb. 16	Bridges along state road, 18 to 75-foot span	County Auditor.
La.	Waterloo	2 p.m., Feb. 17	Constructing 14 culverts	County Auditor.
D. C.	Washington	Feb. 17	Bridge across Anacostia River	Lieut.-Col. H. C. Newcomer, 305 Southern Bridge.
Ore.	Portland	Feb. 17	Two reinforced concrete bridges on Columbia highway	County Comrs.
Ont.	Ottawa	4 p.m., Feb. 18	Hand railing and lighting posts for bridge	F. C. Askwith, Actg. City Eng.
Ind.	Independence	11 a.m., Feb. 19	12 to 24-inch culvert pipe	E. A. Bordner, Co. Aud.
Va.	Lawrenceville	Feb. 19	Steel bridge over Meherrin River	W. T. Sledge, Clerk.
Ill.	La Harpe	3 p.m., Feb. 23	Reinforced concrete bridge	William Bergner, Supt. Hwys.
Ore.	Portland	2 p.m., Feb. 23	Columbia River bridge	Bridge Comm.
La.	Knoxville	1:15 p.m., Feb. 23	About 75 steel, I-beam & reinforced conc. bridges	J. D. Schlottback, Co. Aud.
O.	Zanesville	11 a.m., Feb. 23	Steel bridge construction	Comrs. Muskingum County.
Neb.	Kearney	Noon, Feb. 23	Lumber for bridge construction	J. H. Dean, Co. Clk.
Kan.	Liberal	Noon, Feb. 23	Two wooden pile bridges over Cimarron River	Clerk of Seward Co.
Minn.	Chaska	1 p.m., Feb. 23	Reinforced concrete culvert	J. B. Connolly, Co. Aud.
O.	Cincinnati	Noon, Feb. 26	Concrete bridge	Board County Comrs.
W. Va.	Elkins	Mar. 1	Seven bridges	Thaddeus Pritt, Clerk.
Ind.	Greenfield	Mar. 1	Bridge construction	Oscar Dever, City Clk.
Minn.	Winona	Mar. 1	1,700 ft. bridge approach	H. B. Walling, City Engr.
S. D.	Oacome	1 p.m., Mar. 1	Steel and pile bridges for 1915	F. J. Leggett, Co. Aud.
S. D.	Montrose	2 p.m., Mar. 2	Corrugated metal culverts	A. E. Eckline, Co. Aud.

BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ill.	Bald Bluff	10 a.m., Mar.	2..Reinforced concrete bridge.....	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.
S. D.	Elk Point	Mar.	2..Bridge construction in 1915 (readvertisement)	Edward Holden, Co. Auditor
O.	Hamilton	10 a.m., Mar.	3..Bridge over Great Miami River.....	W. W. Crawford, Co. Aud.
Neb.	Superior	Mar.	3..Reinforced concrete, balanced arch bridge.....	County Clerk's Office.
Va.	Port Monroe	Mar.	3..Concrete foot bridge.....	Quartermaster.
Neb.	Nelson	10 a.m., Mar.	3..Bridge over Republican river	E. E. Hedgecock, Co. Clerk
Neb.	Nelson	Noon, Mar.	3..Bridge construction in 1915.....	E. E. Hedgecock, Co. Clerk
O.	Massillon	10 a.m., Mar.	5..Culvert pipe	Comrs. Stark Co.
Ill.	Biggsville	11 a.m., Mar.	9..Two reinforced concrete bridges.....	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.
Wis.	Racine	Mar.	15..Steel bridge construction.....	Jas. Mutter, Highway Comr.
Ill.	Raritan	11 a.m., Mar.	16..Three reinforced concrete bridges.....	C. R. A. Marshall, Co. Supt. Hwys., Stronghurst, Ill.
MISCELLANEOUS.				
Ill.	Springfield	3 p.m., Feb.	15..Furnishing and installing 18 high-pressure water tube boilers and accessories	Board of Administration.
Pa.	Philadelphia	Noon, Feb.	15..Two remote control electric winches.....	Geo. W. Norris, Director Dept. Wharves, Docks & Ferries.
Minn.	St. Paul	10 a.m., Feb.	15..One automobile runabout, 3 street washing machines.....	Aug. Hohenstein, Pur. Agt.
Ind.	Kokomo	10 a.m., Feb.	15..Disposal of garbage for one year.....	Board Pub. Works.
N. Y.	New York	Noon, Feb.	15..Dry docking, painting and cleaning municipal ferry boats	R. A. C. Smith, Comr. Docks.
La.	Osage	Noon, Feb.	16..180,000 lbs. reinforcing steel and I-beams.....	A. M. Swanson, Co. Aud.
N. Y.	New York	10 a.m., Feb.	16..Repairing and painting steamship.....	John A. Kingsbury, Comr. of Charities.
N. Y.	New York	Noon, Feb.	16..Wheels, axles, etc., for department.....	J. T. Fetherston, Comr. Street Cleaning.
Ont.	Toronto	Feb.	16..Furnaces and appurtenances for refuse incinerating plant.....	Chairman, Board Control.
Ill.	Springfield	11 a.m., Feb.	17..235,000 bbls. cement.....	W. W. Marr, Ch. Hwy. Engr.
Md.	Baltimore	11 a.m., Feb.	17..Sand, gravel, brick and lumber.....	R. C. Thomas, Chief Eng.
N. Y.	New York	11 a.m., Feb.	18..Building seven elevated railroad stations.....	Chief Engineer, 85 Clinton St., Brooklyn.
Tex.	Galveston	Noon, Feb.	23..Motor dredge tender.....	Lieut.-Col. C. S. Riche, U. S. Engr.
N. Y.	New York	Noon, Feb.	23..Dredging in Portchester Harbor.....	Lieut.-Col. W. M. Black, U. S. Engr.
Utah	Provo	Feb.	24..Construction work	U. S. Reclamation Service.
D. C.	Washington	11.30 a.m., Feb.	24..Valves and accessories for dry dock.....	Maj. F. C. Boggs, Gen. Pur. Officer.
Fla.	Bartow	Feb.	24..Construction of city hall.....	City Clerk.
Mont.	Miles City	3 p.m., Feb.	27..U. S. post office.....	O. Wenderoth, Washington, D. C.
Fla.	St. Augustine	10 a.m., Mar.	2..Repairs to county jail.....	Board of County Comrs.
O.	Canton	Mar.	3..140 yds. conc masonry for culvert construction.....	C. L. Stoner, Clk. Co. Comms.
Tex.	Galveston	Noon, Mar.	3..Dredging and Port Aransas culvert construction.....	Lieut.-Col. C. S. Riche, U. S. Engr.
Okla.	Lawton	3 p.m., Mar.	6..U. S. post office.....	O. Wenderoth, Washington, D. C.
Alaska	Ketchikan	2 p.m., Mar.	10..Gas engines, air compressors & hoisting engines.....	U. S. Lighthouse Inspector

STREETS AND ROADS

Alameda, Cal.—The Alameda City Planning Commission has decided to investigate project of proposed industrial highway along north side of the city.

Napa, Cal.—Supervisors of Napa County have sold \$125,000 worth of State Highway bonds for \$117,763 and accrued interest to date of delivery. Purchaser was Anglo and London Paris National Bank of San Francisco, the highest of several bidders.

Oakland, Cal.—Resolutions have been adopted for improvement of various streets.

Oak Park, Cal.—Petition will be circulated along Cypress Avenue in near future calling for improvement of that street from Lower Stockton to Upper Stockton roads.

Sacramento, Cal.—An act for construction of connecting link between coast and valley state highways through Pacheco pass, has been introduced simultaneously by Assemblyman Harold McPherson of Santa Cruz and Senator Benson of San Jose. It calls for appropriation of \$150,000.

Sacramento, Cal.—Assemblyman William A. Avey, Riverside, has introduced bill calling for construction of a \$200,000 highway in Imperial county.

Sacramento, Cal.—Assemblyman Rigdon, of San Luis Obispo, has introduced a bill calling for construction of state highway starting at Bakersfield, taking in Lost Hills and continuing through Cholame pass and connecting with state highway in San Luis Obispo County. He proposes another highway starting at Hanford and running southeasterly to connect with first proposed highway at point near eastern entrance of Cholame pass. According to Rigdon the two highway systems will be directly beneficial to people of southern part of San Joaquin Valley, giving them direct route to ocean. An appropriation of \$200,000 is asked from state for purpose of construction. Sum is made contingent upon Kern County contributing \$400,000, Kings County \$100,000 and San Luis Obispo County \$200,000.

San Diego, Cal.—Following bids have been received for cement work on National Ave. John Engebretsen's bid for cement work was as follows: Sidewalks,

6 cts. per sq. ft.; curbs, 10 cts. per lin. ft., and gutters, 5 cts. per lin. ft. For excavating he asked 50 cts. per cu. yd. and for the fills, 1 ct. per cu. yd. To build culverts and catch basins Engebretsen asked \$1,000, almost twice as much as other bidders. Following are the bids, which were referred to the city engineer: M. D. Goodbody—Excavating, 32.5 cts. per cu. yd.; embankment, 2 cts.; culverts, \$692; walks, 13 cts.; curbs, 38 cts.; gutters, 15 cts. Doran & Reed—Excavating, 32.5 cts.; embankment, 1 ct.; culverts, \$590; walks, 10.9 cts.; curbs, 34 cts.; gutters, 12 cts. G. R. Daley—Excavating, 29 cts.; embankment, 2 cts.; culverts, \$654; walks, 12.5 cts.; curbs, 38 cts.; gutters, 14 cts. Pioneer Truck Co.—Excavating, 39.5 cts.; embankment, 2 cts.; culverts, \$612; walks, 13.5 cts.; curbs, 39 cts.; gutters, 15 cts. John Engebretsen—Embankment excavating, 50 cts.; embankment, 15 cts.; culverts, \$1,000; walks, 6 cts.; curbs, 10 cts.; gutters, 5 cts. Isbell Construction Co.—Excavating, 34 cts.; embankment, 1 ct.; culverts, \$675; walks, 11 cts.; curbs, 39 cts.; gutters, 14 cts. J. W. Calback—Excavating, 38 cts.; embankment, 1 ct.; culverts, \$300; walks, 12 cts.; curbs, 38 cts.; gutters, 13 cts. C. L. Hyde—Excavating, 26 cts.; embankment, 1 ct.; culverts, \$500; walks, 11 cts.; curbs, 37 cts.; gutters, 13 cts.

Santa Ana, Cal.—New road between Huntington Beach and Newport Beach is being discussed.

Santa Ana, Cal.—Following paving plans have been made: Paving of foothill boulevard from Tustin through Lemon Heights, El Modena, and Villa Park to Olive. Paving of Santa Ana canyon road from Olive to Riverside county line. Paving of road between Placentia and Santa Ana canyon road at Yorba. Paving of road between the county hospital and the Garden Grove road.

San Diego, Cal.—Extension of F St. has been ordered.

San Diego, Cal.—Although John Engebretsen's bid to grade National Ave. is the lowest, all bids will be returned to council without recommendation, according to City Engineer W. M. Rumsey.

Colorado Springs, Colo.—An automobile road up Pikes Peak by way of Cascade, is to be built next summer. The

right of way from the government has just been secured.

Jacksonville, Fla.—At informal meeting of members of Board of County Commissioners in office of Commissioner John H. Patterson, it was decided that at regular monthly meeting board will take steps to give voters of Duval County opportunity to vote for or against bond issue to take care of present outstanding indebtedness of county, approximately \$300,000, and to build certain specified roads and bridges.

Alton, Ill.—Board of Local Improvements has ready for public hearing, plans and specifications for 5½ miles of street paving with combination concrete curb and gutter in District No. 2, in which the Western Military Academy and Shurtleff College are located. Pavements will have a 4-in. concrete base, and Alton brick will probably be used. J. E. Schwaab is City Engineer.

Edwardsville, Ill.—W. D. Howden, superintendent of highways in Madison county, is making plans for four and one-quarter miles of hard rock roadway will be made in county in spring. There will be two miles laid in Edwardsville township, three-quarters of a mile in Saline and one and one-half mile in Helvetia.

Galesburg, Ill.—Ordinance for paving of N. Cedar and Sanborn Sts. has been passed by Council at regular session. The improvement contemplates paving of North Cedar from Fremont St. to Dayton St. and Sanborn St. from Broad to West St. Estimated cost is \$15,180.31.

Streator, Ill.—Residents of 11th St. wish to pave with 5-in. concrete base, leaving a strip in center, giving street appearance of boulevard. In order to carry out this plan it will be necessary to narrow berm on each side of street so as to make driveways wide enough for vehicles to pass safely.

Brazil, Ind.—A grand central promenade on National Ave. from McGuire St. on west to Ashley St. on east, has been planned by City Council, when Council by unanimous vote ordered City Engineer F. C. Wilson to prepare plans and specifications and City Attorney T. W. Hutchison to draft ordinance for that improvement.

Huntington, Ind.—Final hearing on the Maple Grove road petition and corresponding remonstrances was set by County Commissioners for March 4. Petitioners wish to have road improved either with asphalt or cement from end of Matilda St. pavement to west line of Mt. Hope cemetery and macadamized further to range line bridge.

Keokuk, Ia.—Main St. from 14th to 20th St. will be paved with brick blocks with concrete foundation and concrete curb during coming summer, according to plans of City Council.

Newton, Kan.—Petition has been presented to City Commission for paving of West Seventh St., signed by number of residents of that street.

Bowling Green, Ky.—Allen County has started on good roads campaign.

Georgetown, Ky.—The Scott Fiscal Court has petitioned State of Kentucky and State Commissioner of Public Roads for proportionate amount of State road fund that may be available for use in Scott county, applying a like amount to be used in construction of two roads of about 23 miles each, one connecting Scott with Grant county, which is on Cincinnati pike, and other connecting this and Owen county, via the Frankfort and Stamping Ground pikes.

New Albany, Ky.—Two bids on improvement of Galt St. have been taken under advisement. They were W. O. Sweeney, \$2.98 a foot, and Goulding Bros., \$2.53 a foot. Board also took under advisement two bids on sidewalk improvements for 1915 under city specifications, the bid of D. C. Collins at 12 cts. a sq. ft., cash, and 14 cts. under the 10-year installment plan, and T. M. McCulloch, \$1.25 a sq. yd.

Pinetown, Ky.—Good roads bond issue of \$250,000 will be voted on Feb. 15.

Williamsburg, Ky.—The County Court has made order calling election to vote on proposition of issuing \$250,000 worth of bonds on April 24.

Lake Charles, La.—A further link in the All-Southern Transcontinental highway will be constructed in near future, the parish of St. Mary having taken steps to provide modern highway along Teche from one end of parish to other. A good roads system has been planned by government engineer, and C. H. Sweetser, of local highway department, will be called in consultation to determine type of road best suited to conditions in the parish. It is proposed to issue certificates of indebtedness to amount of \$200,000, with which about sixty miles of modern highway will be constructed.

Moscow, Me.—Town has asked for appropriation of \$1,500 from State towards making road through forest to settlement of Deadwater.

Baltimore, Md.—Sheet asphalt bids that have been received by Board of Awards for \$350,000 worth of new paving are considered better than those received two weeks ago, according to R. Keith Compton, chairman of Paving Commission. The American Paving Co. and P. Flanagan & Sons are close in their bids. The contract will in all probability lie between them. The highways to be paved are Baltimore St., from Front St. to Broadway; Patterson Park Ave., from Essex Ave. to Pratt St.; Eastern Ave., from Broadway to Patterson Park Ave.; Eastern Ave., from Ellwood Ave. to the eastern city limits, and the intersections of Eastern and Linwood Aves.

Hagerstown, Md.—At meeting of County Commissioners and County Engineer Ernest Darby question of county road building was discussed and plans outlined for coming year.

Hagerstown, Md.—The Washington County Commissioners have voted to build new road from McLaughlin to St. Paul's Church.

Chicopee, Mass.—The following orders have been referred to committee: For macadamizing Ford road from present macadam to top of pumping station hill, with appropriation of \$1,000; for macadamizing Howard St., for macadamizing Front St., from Orchard to Academy St., with appropriation of \$9,000; for macadamizing St. James Ave., from Broadway to Springfield line, with an appropriation of \$5,500.

Hatfield, Mass.—Oiling of stone roads is being considered.

Hinsdale, Mass.—Hinsdale has voted to appropriate \$2,000 for improvement of Peru road, beginning at Peru line, the state giving equal amount; also \$1,000 to improve Washington Road, the state giving an equal amount.

Lowell, Mass.—Following estimates on street work for year 1915 have been submitted as follows: Rogers St., widen

from Nesmith St. to Boylston St., and lay tar macadam from High St. to Boylston St., \$25,000. Grouted granite blocks, Gorham St., from Maple to Manchester St., \$13,000; School St., from Pawtucket St. to Pawtucket bridge, \$7,800; Pawtucket Sq., \$6,500; Moody St., from Merrimack St. to Tilden St., \$13,000; Branch St., from Nichols St. to Smith St., \$3,500; Appleton St., from Pearl St. to Thorndike St., \$18,000; Chelmsford St., from Thorndike St. to Westford St., \$5,500; First St., from Bridge St. to Read St., \$9,000; Thorndike St., from Middlesex St. to Fletcher St., \$5,000; Fletcher St., from Thorndike St. to Liberty Sq., \$4,000; Bridge St., from Hampshire St. to 18th St., \$15,000; Pearl St., \$1,500. Tar macadam work: Gorham St., from Manchester St. to Cosgrove St. Rip up asphalt and lay tar macadam, \$15,000; Chelmsford St., from Victoria St. to city line, \$6,000; Powell St., from Smith St. to Chelmsford St., \$6,000; Smith St., from Liberty St. to Powell St., \$3,000; High St., from East Merrimack St. to Rogers St., \$10,000; Mammoth Road, from Fourth Ave. to East Meadow Road, rip up asphalt and lay tar macadam, \$14,000; Mammoth Road, from East Meadow Road to city line, \$2,500.

Wilbraham, Mass.—Wilbraham has voted to instruct Selectmen to ask aid of State Highway Commission in improvement of its highways. It was voted to appropriate \$1,500 if State Commission will give a like amount.

St. Joseph, Mich.—Council has instructed streets and alleys committee to investigate matter of widening and extending alley between Michigan and Harrison Aves.

Duluth, Minn.—Ordinance appropriating \$9,000 for purchase of road oil during 1915 will receive its second reading.

Duluth, Minn.—Resolutions ordering pavements on Minnesota Ave., Park Point, Woodland Ave. and East Ninth St. are now being prepared. The pavement on Park Point will be a continuation of roadway built last year on Lake Ave. from bridge to Twelfth St. It will run from Twelfth St. across to Minnesota Ave. and then down to Thirty-eighth St. It will be of two-course concrete, forty feet wide, and will cost about \$85,000. The Woodland Ave. pavement will be built from Fourth St. to Kent road, a distance of about eight blocks. Roadway will be thirty feet wide, and estimates for its construction have been prepared by city engineer's office as follows: Sandstone, \$30,848; asphalt, \$25,000; bitulithic, \$24,800; concrete, \$22,840; macadam, \$14,865; and bituminous concrete, \$23,500. Pavement in Ninth St., from Seventh Ave. to Fourteenth Ave. east, will be of crushed rock macadam, and will cost \$31,434, according to estimate.

Maryville, Mo.—The \$25,000 bond issue for improvement of roads and bridges in Lincoln Township, which was authorized in special election Nov. 10 has been sold by County Court to Merchants Loan & Trust Co., of Chicago, for \$25,069.25.

St. Joseph, Mo.—Plans for paving Pacific St. from Agency Road to Ninth St.; Jackson St. from Agency Road to 29th St.; Duncan from 26th to 28th, and Mitchell Ave. from 28th to 33d, are being discussed.

Nashua, N. H.—Bill has been introduced into house by Rep. C. H. Daniels of Hudson calling for construction of State road in that town from its present terminus to Londonderry line.

Bridgeton, N. J.—At meeting of Road Committee of Board of Freeholders and Greenwich Township Committee an agreement was entered into to improve two roads in Greenwich Township as decided upon at last meeting of Board. It was decided to advertise for bids for building the roads.

Bridgeton, N. J.—Bids will be received by E. P. Bacon, County Collector of Cumberland County, New Jersey, at the Court House, Bridgeton, N. J., on Feb. 17, 1915, at 2 o'clock p. m., for the whole or any part of issue of \$24,000 of county road improvement bonds which will be sold at not less than par.

Elizabeth, N. J.—Improvement of North Ave. is being asked for.

Freehold, N. J.—Slightly revised plans and specifications for proposed improvement of Norwood Ave., Deal, have been approved at regular monthly meeting of Board of Freeholders, and clerk directed to advertise for bids as soon as State Road Department had approved revised plans, the bids to be opened at next regular meeting on March 3. Improvement calls for building of wings of amiesite similar to that already laid in the centre of road.

Gloucester, N. J.—Gloucester Township committee has authorized sale of \$5,500 bonds to pay for new amiesite road between Blackwood and Clementon.

Manassas, N. J.—Council has determined to grade new Ocean Ave. for entire width of 50 ft. and place 30 ft. of gravel in center of roadway.

Newark, N. J.—City has borrowed \$50,000 at 3.20 per cent less \$15 from Bond & Goodwin, bankers, of New York. The money will go to account of street openings.

Newark, N. J.—Paving of following streets have been ordered: Niagara St., from Berlin St. to Amsterdam St., with napped, re-clipped granite block pavement on a six (6) inch concrete foundation; paving of Margaretta St., from Amsterdam St. to Ave. L, with napped, re-clipped granite block pavement on a six (6) inch concrete foundation; paving of Fourth Ave. from Fifth St. to Roseville Ave., with asphalt pavement on a six (6) inch concrete foundation; paving of Mapes Pl., from Shepard Ave. to Mapes Ave., with asphalt pavement on a six (6) inch concrete pavement; repaving of Central Ave., from Broad St. to Plane St., with four-inch wood block pavement on a six (6) inch concrete foundation, on both sides of the street railway tracks, with the exception of one (1) foot on each side of said tracks; paving of Elm Road, from Tyler St. to Gotthardt St., with napped, re-clipped granite block pavement on a six (6) inch concrete foundation; repaving of Broad St., from South St. to Poinier St., with three-inch asphalt block pavement on a six (6) inch concrete foundation, on both sides of street railway tracks with the exception of one (1) foot on each side of said tracks; repaving of Ferry St., from its westerly terminus at Market St. to Hamburg Pl., with oblong granite block pavement on a six (6) inch concrete foundation, on both sides of the street railway tracks, with the exception of one (1) foot on each side of said tracks. M. R. Sherrerd is Chief Engineer.

Pasausie, N. J.—Ordinance will be considered for laying asphalt-bound macadam on Spring St. Z. A. Van Houten is City Clerk.

Endicott, N. Y.—Bonds in sum of \$20,000 for Washington Ave. pavement will be sold at 8 p. m., Feb. 16. H. Barker is Village Clerk.

New York City, N. Y.—Borough President Marks has decided to widen sidewalks in Lexington Ave., between 41st and 61st Sts.

Norwich, N. Y.—All indications point favorably to completion of Binghamton-Utica trunk line of improved State road system. About 25 miles of route is unimproved, but contracts will be let this spring for over half of this distance, and Commissioner Carlisle has promised remainder in another year, which will make continuous highway 112 miles in length.

Yonkers, N. Y.—Ordinances have been approved providing for regulating, grading and paving of Yonkers Ave. from 1,000 ft. west of the Bronx River Road to Wilbur St. Bids will be advertised for. Also for a house and storm water sewer in Worth St. and the Saw Mill River Road between Nepperhan Ave. and Lockwood Ave.

Yonkers, N. Y.—Requisitions have been received from department of public works asking for 50,000 gallons of road oil and 8,000 cu. yds. of trap rock in the following quantities: Five thousand yds. 1½-in. rock, 500 yds. ¾-in. rock and 2,500 yds. rock screenings, together with the contract to unload the rock. Bids have been ordered advertised for.

Bexley, O.—Citizens of Bexley at special election has approved issuance of bonds to pay for village portion of street intersections and street paving planned for next spring. Bond issue aggregates \$35,000. About 5 miles of streets are to be improved.

Bowling Green, O.—Resolution declaring it necessary to improve Evers Ave. from Prospect to North Grove St. by macadamizing has been passed.

Columbus, O.—There are 150 streets in Columbus waiting to be improved by paving or repaving this year, according to Service Director Borden, who has just checked up street improvement ordinances. The sinking fund trustees have just accepted \$200,000 worth of bonds to pay city's share of cost of street improvements during the year. Contracts will be awarded for improvement of streets until this \$200,000 fund is exhausted. Nell Ave., Bryden Rd., West Goodale St. and Indianola Ave. north of

Arcadia are among important streets in list for improvement.

Fremont, O.—The \$10,000 Ballville Township road improvement bonds to be used for work immediately on roads south of this city will be bought by Fremont Savings Bank.

Geneva, O.—Ordinance calling for paving of South Broadway has been amended so that it provided for any kind of pavement which state aid road might be constructed of.

Hamilton, O.—Ordinance has been passed providing for issuing of \$25,000 of bonds to pay in city's portion for paving various streets.

Lima, O.—Because there was so little difference between three lowest bids for the paving on North West St. from Murphy St. to Robb Ave., the letting of contract was postponed by county commissioners. The three lowest bidders were the Brooks Construction Company, Michael O'Brien, and Richard Stone. All of the bids ranged about the \$10,000 mark. That of the Brooks Construction Company was slightly under others.

Marietta, O.—Petitions will be circulated for paving of Phillips St. from Greene St. to corporation limits; of Oakwood Ave., from Vine to Chestnut St., and all intersecting streets.

Mount Vernon, O.—The Knox County Board of County Commissioners voted to issue \$71,500 worth of bonds for highway and other improvements to be made coming year.

Navarre, O.—Paving of Main St. is being considered. Council has employed Gurley & Rice, Canton surveyors, to make survey and prepare plans, specifications and estimates of cost and they will report within next month. If estimates are not too high work will be pushed ahead. Proposition is to pave Main St. from St. Paul's church to canal and Canal St. from Agnes property to Basin St. In all about mile of thoroughfare is included.

Salem, O.—A long step toward program of highway improvement was taken by County Commissioners when they decided to issue bonds in sum of \$350,000 and to ask state to provide like sum, making fund of \$700,000 available for road improvement purposes. If this sum is secured it will complete improvement of Lincoln highway through county; the inter-county road from this city to Lisbon, and leave upwards of \$100,000 to take care of various other highway projects.

Springfield, O.—Resolutions have been adopted for improvement of various streets with paving with wood block, granite, bitulithic or asphaltic concrete. W. H. Mahoney is Clerk of City Commission.

Troy, O.—Bids for improvement of Elm St. will be received until noon, Feb. 17, at office of Director of Public Service. Following is engineer's estimate of quantities: 3,000 sq. ft. of sidewalk at 10 cts.; 3,380 lin. ft. of cement curb with curb bars at 55 cts.; 280 lin. ft. of header curb at 30 cts.; 132 cu. yds. of concrete in wall along D. & T. tracks at \$6; 8 cast iron inlets (new), set complete, at \$9; 1,050 lin. ft. of 10-in. sewer laid complete at 50 cts.; 380 lin. ft. of 12-in. sewer laid complete at 60 cts.; 450 lin. ft. of 15-in. sewer laid complete at 70 cts.; 4,000 lin. ft. of 1-in. elastite joint or its equal at \$5.02 per 100 ft.; 6,000 sq. yds. of brick paving complete at \$1.90; 1 man-hole complete at \$25; total, \$15,800.80.

Youngstown, O.—Resolutions have been passed for paving of Kensington Ave., Shelley Rd., Wick Ave., Madison Ave. and Hawn St.

Youngstown, O.—Fifteen bids for nine different issues of city bonds have been opened by City Auditor Jones. The issues aggregate \$59,000 and their proceeds will be for purpose of street improvements and police and fire department signal system and West Ave. bridge improvement.

Youngstown, O.—Paving of various streets have been ordered.

Salem, Ore.—State Highway Commission has decided to begin soon construction of portion of Columbia River highway in Hood River County, estimated cost being \$50,000. Bids are to be advertised for first week in March.

Abington, Pa.—Approximately \$80,000 will be expended for municipal affairs of Abington township during next fiscal year. The 1915 budget, as approved by Commissioners, gives \$21,400 for highway improvement and new roads. An item of \$1,600 has been approved for motor car for use as patrol wagon. Charles F. Mebus is president of Board of Commissioners.

Beaver, Pa.—In view of excessive cost

of maintenance of dirt streets, Supt. of Streets Piper has recommended issuance of bonds for paving these streets and recommends that it be applied immediately to paving of Seventh Ave. from 20th to 21st St.; Sixth Ave. from Eighth St. to 11th St., including Ninth and Tenth Sts., between Sixth Ave. and Seventh Ave.; Fourth Ave. from 11th St. to 17th St.; 17th St. from Fourth Ave. to Seventh Ave., and Fourth Ave. from Sixth Ave. to 11th St.

Hazleton, Pa.—Ordinance has been introduced providing for \$30,000 bond issue for paving and sewers.

Hazleton, Pa.—Road work in township the coming summer is being considered. Plans now being worked out for start of work in early spring call for laying of large portion of amiesite.

Philadelphia, Pa.—Business men from Woodland Ave. Assn. have obtained promise from Mayor Blankenburg and Director Cooke that if appropriation is obtained from Councils, the paving of this highway with vitrified brick will be continued from 56th St., the terminus of present improvement, to city line at Cobb's creek. The repaving of Woodland Ave. is under contract, for \$30,000, from 50th to 56th, and it will cost \$40,000 to continue the work to 62d St., and \$80,000 west from that point to the creek. Mayor promised to send message to Councils urging appropriation of \$40,000 for the purpose.

Philadelphia, Pa.—About \$300,000 is to be expended for surfacing materials, torpedo sand and gravel. T. P. Johnston was low bidder for torpedo sand and washed gravel at \$1.94 per ton. There were a dozen bidders for 635,000 gallons of bituminous materials and oils. The Ambler Davis Co. was low, at 4 84-100 cts. per gallon for asphalt road oil, to be placed on unimproved roads to hold the dust. The United Gas Improvement Co. was low bidder on 250,000 gallons of bituminous material, coal tar base, cold application, at 6 9-10 cts. per gallon, applied. The U. G. I. and the Barrett Co. were tie at 8½ cts. per gallon for 60,000 gallons of the same material, applied hot. The Barrett Co. was low bidder on 30,000 gallons same material, applied cold, at 6 cts. per gallon, and on 10,000 gallons, applied cold, at 8 cts. The U. G. I. prices were 7 74-100 and 9 cts., respectively. Main, Warring & Cummings were low bidders on 35,000 gallons liquid asphalt, applied hot, at 4 99-100 cts. per gallon. The Union Co. was bidder, with many others, for these materials and work of applying.

Philadelphia, Pa.—Improved paving for principal arteries of traffic in central section of the city, including Chestnut, Walnut, South and Vine Sts., and intersecting streets from Delaware to Schuylkill Rivers, is possible now that appropriations for highway improvements from the \$11,300,000 loan are about to be made by Councils. Chestnut St. is in such condition that further attempts to make repairs upon a "floating foundation" of loose stone are futile and a waste of money. It will cost something more than \$100,000 to repave street from river to river with wood block, on concrete foundation, and small dressed granite block between the car tracks and as a guard along the outside of each rail. The same kind of paving for Walnut St. will cost about as much as that of Arch St., where wood block from river to river cost about \$130,000. Merchants of South St. want wood block, while others believe that a small, dressed, grouted granite block would prove the more serviceable and almost noiseless character of pavement. This new paving will cost less than \$100,000, and for Vine St., from Front St. to Broad, may not cost over \$75,000. There is a pressing demand for new paving for Chestnut, Walnut, Vine and South Sts. There is also before Highway Committee and Councils requests for new paving on intersecting streets, beginning at Fifth St. and extending west as far as 17th. There is in \$11,300,000 loan item of \$600,000 for repaving streets between Snyder and Columbia Aves., and the two rivers. If \$400,000 is used for repaving Chestnut, Walnut, South and Vine Sts., at least an additional \$200,000 will be required for cross streets named.

Pottsville, Pa.—Matter of paving Second St., calling for voting on additional bond issue of \$30,000, is being discussed.

Wilkes-Barre, Pa.—Bids have been received for street signs from following firms: Irving Iron Works, DeMun Sign Co., Good Roads Machine Co., Central Foundry Co., Joseph N. Early, Interlocking Sign Co. and P. A. Cake.

Williamsport, Pa.—The first important move on part of city toward extension of West 4th St. through Moore estate and old fair grounds has been made. The commission approved resolution adopting survey made by City Engineer John B. Otto and authorized introduction of ordinance providing for extension of West 4th St. over route made by Mr. Otto in his survey. An estimated cost of work is placed at \$17,000.

East Providence, R. I.—Bids for paving blocks to be used on Taunton Ave. have been opened. Proposals to supply 100,000 blocks have been read from seven concerns as follows: Nelson A. Bennett, \$52 per 1,000; R. B. Marriott & Son, \$61 per 1,000; the Smith Granite Co., \$69.25 per 1,000; Booth Bros., \$59.50 per 1,000; Wern Stone Paving Co., \$61 per 1,000; the Savoie Quarry & Construction Co., 50,000 at \$67.45, and 50,000 at \$70.50; the New England Granite Works, 25,000 at \$66.25, 25,000 at \$66.50, 25,000 at \$66.75, 25,000 at \$66.90. On suggestion of Town Engineer Waterman bids were continued for two weeks.

East Providence, R. I.—Town Clerk Smyth has been instructed to advertise for bids for issue of highway bonds in sum of \$32,000.

Edgewood, R. I.—Citizens are in favor of proposed bond issue of \$100,000 for use of highway building.

Providence, R. I.—Bids for furnishing city with granite curbing have been opened by Board of Contract and Supply. The bidders were as follows: R. B. Marriott & Sons, McDonnell & Corbett, Capoli & Passarelli, Leo Stone Co., John Capoli & Co., Albert Lippitt and Crabtree & Haley.

Providence, R. I.—By vote of 38 to 0 Common Council has adopted resolution recommended by highways committee directing paving of Broad St., from Prairie Ave. to city line, with asphalt, and of Messer and Knight Sts. with bitulithic.

Austin, Tex.—Automobile street cleaning apparatus is being discussed. A motor sprinkler and one motor sweeper are recommended.

Ballinger, Tex.—Petitions asking for calling of \$60,000 bond issue for Precinct No. 1 of Runnels County, are being circulated here.

Belton, Tex.—Commissioners' Court has approved the bond of M. W. Taylor as contractor to build gravel roads in Holland Road district. Work will begin within next ten days.

Fort Worth, Tex.—Street Commissioner Grant has filed recommendation to City Commission that \$500 be spent immediately to replace 1,000 missing or defaced street signs.

Galveston, Tex.—Recommendation for paving of 29th St. from Market to Ave. H, or at least to Church St., thence west on Church as far as 37th St., will be made to Board of City Commissioners.

Longview, Tex.—County Commissioners have decided to start work on Glade-water Rd. to macadamize it 4 or 5 miles, beginning at the city limits. This is the Texas, Arkansas and Louisiana highway.

Terrell, Tex.—M. W. Raley, L. E. Griffith and D. M. Weatherford, Road Commissioners elected to supervise building of public roads, contemplated by \$300,000 road bond issue voted in Terrell and Elmo District of this county, are taking steps to sell bonds, and, if possible, work out plan to begin work on roads and afford employment for many idle people.

Pulaski, Va.—City council has sold to Provident Savings Bank and Trust Company, of Cincinnati, \$80,000 worth of 5 per cent. bonds for street improvement.

Benwood, W. Va.—Special election will be held in Union district March 6 to submit to vote of people of district proposition of building \$50,000 worth of tar-bound macadam on Fairmont pike instead of brick pavement.

Seattle, Wash.—Plans have been received from engineers for paving of Railroad Ave. and seawall at cost of \$120,000, also grading, etc., of Alki Ave. to cost \$91,000 and paving of Valley St., to cost \$37,000.

Tacoma, Wash.—Pierce County Commissioners have been petitioned by City Council to assist in extension of Pacific Ave. pavement from 64th to 96th St. Cost of pavement is estimated at \$49,000, proposition of City Commissioners providing that city and county each pay half.

Janesville, Wis.—Council has passed a resolution for paving of South Wisconsin St., from Third St. to Oakland Ave., with asphalt macadam.

Superior, Wis.—City Commission has adopted resolution providing for im-

provement of Weeks Ave. from 4th St. to Belknap St. Paving of Weeks Ave. is part of extensive street improvement campaign planned for this season.

CONTRACTS AWARDED.

Tucson, Ariz.—For improving Pennington and other streets to Arizona Asphalt Paving Company as follows: 15,340 square yards bitulithic pavement at \$2.195 per square yard; 16,452 square feet cement sidewalk at 15 cents per square foot; 2,092 feet concrete curb at 60 cents per linear foot, etc.

Bakersfield, Cal.—By Board of Supervisors of Kern County, for paving section of Bakersfield-Taft Road between Bakersfield and Old River Shore, to Geo. S. Benson & Son, at \$45,998.

Long Beach, Cal.—To Los Angeles Paving Company, Los Angeles, for paving American Ave. with asphalt at \$35,914.

Los Angeles, Cal.—Following street contracts have been awarded to Bryant & Austin for paving Vermont Ave. and to G. H. Oswald for paving Hoover St. at \$127,764 and \$48,526 respectively. For improving Wilton Pl. from Pico to Washington Sts. to Fairchild-Gilmore-Wilton Company at \$19,016.50. For paving Wilhardt St. from North Main to San Fernando Sts., also other streets, to Fairchild-Gilmore-Wilton Company at \$28,209. For improving Vermont Ave. from Melrose Ave. to Los Feliz road, to Bryant & Austin at \$127,764. For improving Vernon Ave. from Alameda St. to Staunton Ave., and from Honduras to Main Sts., to G. H. Oswald at \$38,017.

Los Angeles, Cal.—For improvement of Mariposa Ave., to the California-Arizona Construction Co., at following bid: 15 4-10 cts. per sq. ft. for asphalt concrete paving, Specifications No. 102; 28 cts. per lin. ft. for cement curb, Special Sec., Specifications No. 88; 45 4-10 cts. per sq. ft. for granite block gutter, Specifications No. 71; 11 cts. per sq. ft. for cement sidewalk, Specifications No. 84.

Los Angeles, Cal.—For doing work of Road District Improvement No. 42, to C. T. Salata at \$23,455.

Los Angeles, Cal.—For doing work of Road District Improvement No. 41, to White & Gaskill at \$16,000.

Pasadena, Cal.—Contract has been let by commission, that for street work on Corson St. between Hill and Sierra Bonita to H. E. Cox at \$3,038.60, the three others being Hart & Denney, \$3,178.38; J. C. Kinsman, \$3,660.37, and T. C. Breitenstein, \$3,146.53. Contract provides for 1,163 lineal feet of grading, 36,000 square feet of oiling with a two-inch surface, 2,326 feet of curb and 7,630 square feet of gutter.

Riverside, Cal.—To Oscar Ford, Riverside, at \$18,471, for constructing 20,000 ft. concrete pavement on route 3, Corona to San Bernardino County line.

Champaign, Ill.—For paving W. White and W. Healy Sts., to Stipes & Pilcher, Champaign, at about \$28,136 and \$26,066 respectively.

Mattoon, Ill.—For construction of brick pavement (14,389 sq. yds.) on concrete foundation, at \$1.59 per sq. yd., to C. A. Michael, Mattoon, Ill. Also 10,070 cu. yds. excavation at 27 cts. Total bid \$30,500. Other bids were: P. J. Goggin, Arcola, Ill., \$31,100, and A. J. Parish, Paris, Ill., at \$31,300. C. L. James is City Engineer.

Oakland, Ill.—For construction of brick pavement on concrete foundation, lowest bidder was C. A. Micales, Mattoon, Ill., at \$1.57 per sq. yd., and 27 cts. per cu. yd. for excavation.

Brazil, Ind.—For road work, lowest bid was received from M. L. Lassell, Clay City, Ind., at \$7,800.

Delphi, Ind.—By Commissioners of Carroll County to Smith Bros., Flora, Ind., at \$5,100, for grading, paving and improving road in Jefferson Township.

Fowler, Ind.—For construction of gravel road, to Oscar Anderson, Fowler, at \$12,989.

Greenfield, Ind.—By Commissioners of Hancock County, for macadam road, to Everett McMahan, Fordville, Ind., at \$32,988.33.

Hartford City, Ind.—Contract for Carroll road, near south end of county, has been let by County Commissioners to John W. Slater, whose bid was \$15,900. There were nine other bidders. Road is 3 miles in extent and is to be built of crushed stone.

Indianapolis, Ind.—Indiana Refining Co., at \$0.0274 per gal., is low bidder for supplying oil to city for use on unimproved streets. About 500,000 gals. required. Contract has not yet been awarded.

Liberty, Ind.—By township, for 2½

miles macadam pavement, to Taber & Hulihan, Wabash, Ind., at \$13,727.

Muncie, Ind.—County Commissioners have awarded contracts for construction of six roads, three in Harrison Township and one each in Union, Washington and Delaware Townships. Following are contracts awarded: William Ritchie road, Harrison Township, sold to C. V. Rector for \$6,300, 12 bids in all; Alonzo Pittenger road, Delaware Township, sold to Frank Hines for \$6,650, 7 bidders in all; W. L. Gray road, Washington Township, sold to Snyder & Harnett for \$19,266, 13 bidders in all; Andrew Woodring road, Harrison Township, sold to Lewis Peck for \$4,978, 13 bidders in all; S. O. Thomas road, Harrison Township, sold to Lewis Peck for \$6,100, 14 bidders in all; M. H. Brandt road, in Union Township, sold to Snyder & Harnett for \$6,590, 6 bidders in all.

Rensselaer, Ind.—For construction of following stone roads: In Walker Township, to A. S. Keene, Wheatfield, Ind., at \$3,970; in Carpenter Township, to W. F. Smith & Co., Rensselaer, Ind., at \$9,000, and 1 stone road to Moneybun & Son, Monticello, Ind., at \$20,875.

Richmond, Ind.—Burkhardt has received the contract for cement curbs, gutters and sidewalks on South 19th St., from Main to A. Bid, walks, 9 cts. per sq. ft.; curbs and gutters, 58 cts. per lin. ft.; circular curbs, 65 cts. per lin. ft.; alley intersections, 10 cts. per lin. ft. Snyder Bros. received contract for graveling of South D St., from 15th to 16th, with cement curbs, gutters and sidewalks, on a lump bid of \$4.25 per lin. ft. North 15th St. contract for cement walks, from Main to E, went to Burkhardt on bid of 9½ cts. per sq. ft. He also secured contract for cement walks, curbs and gutters on North 16th St., from Main to F, on the following bids: Walks, 9 cts. per sq. ft.; curbs and gutters, 58 cts. per lin. ft.; circular curbs, 65 cts. per lin. ft.; alley intersections, 10 cts. per lin. ft.

Seymour, Ind.—For improving various streets by paving with concrete to DeGolyer & Masters at \$37,000.

Shelbyville, Ind.—For construction of macadam pavement, by County of Shelby, to Wm. Avery, Waldron, Ind., at \$8,100.

Valparaiso, Ind.—For construction of stone roads, following contracts have been awarded by Porter County: Roy Demass, Chesterton, Ind., 4 roads at \$14,316; Gary Const. Co., Gary, Ind., 2 roads at \$7,000; B. J. Wiseman, Chesterton, Ind., 4 roads at \$16,175, and Jake Ackerman, Laporte, Ind., 4 roads at \$16,560.

Vincennes, Ind.—For construction of 5 gravel roads, contracts have been awarded to following bidders: John H. Orebay, Wheatland, Ind.; Michael Clauss, R. F. D., Vincennes; Chas. Velte, Vincennes, R. F. D.; Snapp, Beard & Rogers, Vincennes, and Jacob N. Seibel, Decker, Ind. J. I. Muentzer is Auditor.

Louisville, Ky.—By Board of Public Works, for street paving, to American Standard Asphalt Co. and Southern Asphaltolene Co., to pave Madison St., from 31st St. to Shawnee Park, at cost of \$84,000; to Henry Bickel Co., to reconstruct Market St., from Jackson to Hancock St., and to L. R. Figg Co., to reconstruct Lytle St., from 14th to 15th St., with vitrified blocks. Estimated cost \$5,500.

North East, Md.—State Roads Commission has awarded R. M. Sproul, of Philadelphia, contract to build a mile of concrete road through town of North East.

Flint, Mich.—Contractor W. B. Hutchinson, of Laporte, Ind., has been notified by City Engineer Shoecraft that he is lowest bidder on ten brick pavements, the total cost of which amounts to about \$150,000. There were 18 bidders. Mr. Hutchinson expects to ship his paving outfit to Flint within a few weeks.

Flint, Mich.—For 50,000 brick and sheet asphalt pavement, three lowest bidders are as follows: S. S. Saxton, Chicago, Ill., for sheet asphalt at \$1.69 per sq. yd.; Grace Const. Co., Fort Wayne, Ind., \$1.71 and \$1.59 per sq. yd.; Wm. Hutchinson, Michigan City, Ind., with brick at \$2.07. City furnishes cement. Contracts will be awarded Feb. 8. E. C. Shoecraft is City Engineer.

Royal Oak, Mich.—For constructing 4½ miles concrete road on Woodward Ave. to R. D. Baker, of Detroit, at \$59,674.

Jackson, Miss.—For resurfacing with sheet asphalt about 8,000 sq. yds., con-

tract was awarded to F. G. Proudfoot, Chicago, Ill., at 56 cts. per sq. yd. L. A. Scott is City Clerk.

Edina, Mo.—By city, to A. Jaicks Co., of Kansas City, to pave and curb several streets.

Passaic, N. J.—For improvement of Bond St., contract has been awarded to Frank J. Marley, of Little Falls.

Perth Amboy, N. J.—Contract for furnishing of 24,000 stone blocks for paving of Front St. has been given to Graham & McKeon, of this city. Graham & McKeon will furnish blocks, 6x8x12½ ins. in size at \$48 per 1,000, for paving Front St. Bids for block were as follows: Graham & McKeon, one grade, \$37.50 per 1,000; another \$45 per 1,000, and a third \$48. Chamberlain & Patter, No. 1 block, \$75 per 1,000, f. o. b. Perth Amboy; No. 2 grade, \$49 per 1,000. Frederick Starr Contracting Co., second-hand blocks, \$30 per 1,000, provided the company could get free wharfage and the city would unload the material; second-hand Belgian block, \$20 per 1,000. Wern Stone Paving Co., Inc., block f. o. b. Perth Amboy, \$1.70 a sq. yd. Hans Satter & Son, Rhode Island block, \$78 per 1,000; Massachusetts, \$80; Maine, \$80; New Jersey, \$65; old block, \$50; curbing, 40 cts. a foot.

Buffalo, N. Y.—For constructing 2.84 miles of LeRoy-Pavilion road with water-bound macadam to Chilson & Gibson, 306 Cenburn Ave., at \$26,939.

Long Island City, L. I., N. Y.—Following street contracts have been awarded: Public Work Contracting Company, Long Island City, for repaving roadway and constructing pile and timber bulkheads in Rockaway turnpike from New York avenue to Hook Creek at \$12,130, and to J. DiNienna, Long Island City, for grading, curbing and laying sidewalks in Hancock St. at \$10,543.

Ashtabula, O.—To T. P. Fitzgerald, 304 Main St., city, at \$40,000, for paving of South Ridge Rd. and Jefferson Rd.

Cincinnati, O.—For constructing approach from Clifton Pl. to athletic field of University of Cincinnati, to Kirchner Construction Co., Cincinnati, O., at \$11,720. Other bids were: Scully Bros., \$11,921; Henkel & Sullivan, \$11,951; Joseph A. Byrnes, \$12,096; C. A. Danenhower, \$12,991.

Columbus, O.—City Board of Control has let contracts for streets and sewers aggregating \$13,400 as follows: to J. C. Beasley, paving, alley north of Sixth Ave., from Michigan Ave. to Perry St., \$2,000; paving Hoster St., High to Lazelle St., \$4,500; paving Wall St., Butties to Hubbard Ave., \$2,400; grading Miller Ave., Columbus to Schiller St., \$1,000; to George Geigle & Son, sewer in alley north of Markeson St., Seventh St. to corporation line; Monarch Construction Co., Eldon Ave. storm sewer extension, \$1,500; I. O. Jones, sewer in alley west of Glenwood, Town St. to Sullivan Ave., \$540; J. F. Ryerson, sewer in Seventh St., Hanford to Jenkins St., \$600.

Troy, O.—The Andrews Asphalt Co. has been awarded contract to pave South Market St. in Troy, O., estimated cost of work being \$22,854.

Troy, O.—For 13,700 sq. yds. asphaltic concrete on gravel foundation to Andrews Asphalt Paving Co., Hamilton, O., at \$1.45 per sq. yd. Total bid, \$22,717.72. M. A. Gantz is City Clk.

Wadsworth, O.—By Village Council, for paving Highland Ave. with brick on concrete base to Peters & Baird at \$3,500.

Forth Worth, Tex.—Fort Worth contractors have purchased \$400,000 worth of road bonds issued for Precinct 1 of Hunt County, which includes Greenville. Same firms are given contract for macadam and concrete roads that are to be built. The successful bidders are Roach-Manigan Paving Co. of Texas and B. L. Waggoner & Co.

Allentown, Pa.—Contracts for grading at Fountain and Maple Sts., has been awarded to the Weaver Contracting Co. for 550 cu. yds. of excavation at 40 cents per cu. yd.

Beaver, Pa.—Contract for 260,000 wire cut paving blocks has been awarded to Face & Fire Brick Co., Eastvale, at \$12.75 per thousand, for March delivery. These bricks will be used in paving or repaving of lower Seventh Ave.

Providence, R. I.—Report has been received transmitting proposals for paving certain streets and recommending that contracts be awarded as follows: Broad St., to Narragansett Improvement Co., asphalt; Messer St., to Warren Bros. Co., bitulithic; Knight St., to Warren Bros. Co., bitulithic. Contracts were ordered so awarded.

Harriman, Tenn.—To Solomon Construction Company, Harriman, and Oliver & Hall Construction Company, Maryville, at \$270,000 for constructing Morgan county pike road.

Greenville, Tex.—By permanent Road Com. Hunt County Road Dist. No. 1, to Roach-Manigan Paving Co., of Fort Worth, to construct about 40 miles concrete road, to cost \$400,000; contract calls for paving 6 cardinal roads radiating from Greenville. Bridges and culverts to be of concrete. Consulting engineer is Julian C. Field, of Denison and Greenville.

San Antonio, Tex.—By Bexar County Commissioners, to L. S. Campbell, to clay 56 miles Hardy Road.

Waco, Tex.—To Austin-Western Rd. Mfg. Co., Chicago, Ill., for several road graders.

Lynchburg, Va.—To Jones & Miller, Lynchburg, for 1.1 miles 4-ft wide concrete sidewalks. Harry Shaner, Lynchburg, is engineer.

Bluefield, W. Va.—To Sullivan & Tilson, Union Bank & Trust Co. Building, Bluefield, to construct several miles of macadam paving.

Rhineland, Wis.—For constructing the Gogebic County line road by Commissioners of Oneida County to Hicks & Barber, at \$31,050.

Niagara Falls, Ont., Can.—The Welland County Council have awarded Standard Crushed Stone company of this city contracts to supply all stone used for road improvements during this year and next year. The company's bid was \$1.10 a ton for crushed stone, \$1 a ton for screenings and dust, 65 cents a ton for dust, delivered to any part of county.

SEWERAGE

Stockton, Cal.—Residents of south side have voted to ask Commissioners to proceed with sewer work in that section immediately after proposed city sewer bonds carry. District where sewers will be laid is bounded by South St., the Southern Pacific tracks, 9th St. and Center St. The Mossdale tract is also included.

Pablo Beach, Fla.—Sewerage system will be installed.

Chicago Heights, Ill.—Proceedings for building a storm water sewer on West Side are being made by Board of Local Improvements.

Streator, Ill.—Sewer and drain committee has recommended placing of six hundred feet of new sewer on E. Bridge St. Total cost \$450.

Indianapolis, Ind.—Board has adopted resolution for local sewer in Draper St. and Cottage Ave., to cost, approximately, \$10,000.

Baltimore, Md.—Board has approved of plans presented by Calvin W. Hendrick, engineer to Sewerage Commission, for \$250,000 worth of sewerage work. Included in these contracts, which will be advertised for bids at once, is Ellwood Ave. sewerage plan, which calls for outlet that will distribute storm water without interfering with boats that are tied up at landing.

Amherst, Mass.—Town will vote on loan of \$30,000 for general sewer purposes, and to construct south outlet sewer.

Flint, Mich.—On Feb. 17, taxpayers will vote on \$106,000 worth of sewer bonds.

Duluth, Minn.—A sanitary sewer in alley between Leicester and Kenilworth Aves. will be ordered.

Hibbing, Minn.—Bids for material for forty cast iron manhole covers and heads, combined weight to be 350 pounds, have been advertised for by village council. Among material wanted is 50,000 perfectly shaped smooth surfaced hard-burned brick of the best quality.

Newark, N. J.—Bids for construction over two routes, of southern part of Section No. 18, of Passaic Valley trunk sewer, have been received by Passaic Valley Sewerage Commission in Essex building. Name of successful bidder and route to be traversed probably will be announced in two weeks. Route of this section of sewer, which begins at Second Ave. and River St., Paterson, and runs to Fifth Ave. and East Eleventh St., is optional with contractor. Lowest bid on what is known as the river bank route, running through a sparsely populated section, which would permit construction from surface, was \$191,894. This was submitted by New York and New Jersey Construction Company of Newark. Lowest bid on what is known as the tunnel route, which runs through a section so thickly populated that tunneling would be necessary all the way, was \$187,392.50, submitted by Charles A. Haskin of Charlestown, Mass. Tunnel

route is 3,395 feet long; the river bank route, 3,438 feet long. There were five bids received on the former and three on the latter.

Binghamton, N. Y.—As result of conference between city and state officials and Senator William H. Hill, representing village of Lestershire, agreement was arrived at in Albany which will unite sewage disposal plants of Binghamton and Lestershire. It is estimated cost of intercepting sewer system and sewage disposal plant complete would be in the neighborhood of \$500,000.

Niles, O.—Bids will be received at office of city auditor of city of Niles, until 2 o'clock p. m., of March 1, 1915, for purchase of bonds in aggregate sum of five thousand (\$5,000) dollars for purpose of paying portion of cost of construction of Maple Ave. sewer. Homer Thomas is Auditor.

Toledo, O.—Resolution has been passed declaring it necessary to construct, maintain and operate main sanitary sewer No. 13, in subdistrict No. 1 of Lucas county, O., main sewer dist. No. 4, in Washington Twp., Lucas county, O.

Hazleton, Pa.—Ordinance has been introduced providing for \$30,000 bond issue for sewers and paving.

Philadelphia, Pa.—At meeting of community committee on Frankford Creek, in rooms of the Frankford Board of Trade, Frankford Ave., it was decided to petition councils to make loan of \$1,000,000 for construction of sewer and disposal plant that would eradicate alleged abominable condition of stream.

Lebanon, Pa.—Councilman George F. Krause, superintendent of department of streets and public improvements, has introduced measures calling for expenditure of a sum aggregating close to \$10,000 ordinances calling for construction of a storm sewer, P. & R. to Lehman, on 8th St., and construction of concrete bridge, 10th St. over Quittapahilla.

Parkesburg, Pa.—By vote of 141 to 7 citizens of Parkesburg have empowered Council to borrow \$28,000 for building of sanitary sewer system and disposal plant.

Pottsville, Pa.—Ordinance providing for completion of stretch of sewer on Mill St. from Front to Sherman St. has been passed finally.

Providence, R. I.—Resolutions have been adopted for construction of sewers in various streets.

Warren, R. I.—Sewer commission has called for sealed bids for construction of 15,000 ft. of sewers, 8 to 18-in., sedimentation tanks, wells and motor houses.

Walterboro, S. C.—See "Lighting and Power."

Dallas, Tex.—Receipt of proposed sewerage disposal plant specifications are expected to arrive immediately and bids on construction of two large sewer mains in Oak Cliff, which will form parts of system will be called for at once by the Board of City Commissioners. Commissioner R. R. Nelms received word yesterday from James H. Fuentes, engineer who drew the plans, that they have been forwarded from New York.

San Benito, Tex.—Election to have been held Feb. 2 to vote \$8,000 bonds for street and sewage disposal plant improvements has been postponed by City Commissioners for 30 days in order to investigate further into proposition.

Suffolk, Va.—According to report of Dr. H. W. Campbell, filed with city council it will cost \$7,680 to install sewerage system in the Holland-Baker white residential section, and colored residential section known as Philadelphia. Report was received and filed.

Tacoma, Wash.—Bids for sewer at North 21st St. and Union Ave. have been opened at Commissioner Woods' office. The bids were: Joe Gallucci, \$1,519; John Capper and G. Amabile, \$1,535; Joseph Martel, Jr., \$1,845; Paine Construction Co., \$1,545; Fermo & Ricco, \$1,498; Mocerri & Carbone, \$1,594; A. Tignanello, \$1,749. City's estimate on work was \$1,933.

Superior, Wis.—At meeting of City Commission bids were opened for \$32,000 worth of general sewer bonds. H. T. Holtz & Co., of Chicago, were highest bidders, offering premium of \$1,157 above par and will be awarded bonds, providing all of requirements are met.

Watertown, Wis.—Resolution has been adopted for construction of sanitary sewer in North Maple St., also sewers in various other streets.

CONTRACTS AWARDED.

Bakersfield, Cal.—For constructing clay pipe sewers in Districts 22 and 23 to

Wm. J. Tobin, 735 Filbert St., Oakland, at \$8,285.

Bakersfield, Cal.—For vitrified sewer pipe, lowest bidder was Wm. J. Tobin, 735 Filbert St., Oakland, Cal., at following bid: 6,144 ft. 6-in. pipe at \$0.63; 1,600 ft. of 8-in. pipe at \$0.84, and 185 ft. 10-in. pipe at \$0.90; 7 manholes at \$56.50 each. Total bid, \$5,846.72.

San Diego, Cal.—For construction of sewer in Upas St. and in alley between 32d and Bancroft Sts., to C. H. Julian, at \$2,731.95.

San Francisco, Cal.—For constructing sewer in 19th Ave., Noriega St. and 20th Ave., to Karl Ehrhart at \$49,984.50.

South Pasadena, Cal.—By trustees of South Pasadena for completion of city hall sewer system and building of outfall to Alhambra road to connect with Pasadena outfall system, to Watson & Spicer of Los Angeles. Eleven firms registered bids on work.

Hartford, Conn.—For vitrified tile sewer pipe, lowest bidder was O'Neil Bros. at following bid: 212 ft. 24-in. pipe, \$4.60; 970 ft. 20-in. pipe, \$2.80; 703 ft. 18-in. pipe, \$2.70; 260 ft. 15-in. pipe, \$2; 810 ft. 10-in. pipe, \$1; 6-in. house connections 12 ft. long, \$10; 38 ft. long, \$38, and 15 ft. long, \$10; 11 manholes at \$40, and 1 at \$30. Total bid, \$8,800.30. R. N. Clark is City Engr.

Maunee, Fla.—By City, to R. M. Hudson, of Atlanta, Ga., to construct sewer system, water works and street paving.

Hapeville, Ga.—By city, for proposed sewer installation, to Case & Cathran, 1507 Candler Building, Atlanta, Ga. Work includes 20,300 ft. 8-in., 3,400 ft. 10-in. and 2,750 ft. 12-in. pipe, 3 septic tanks, 23 automatic flush tanks and 26 manholes.

Moscow, Ida.—To Witter-Fisher Co., of Moscow, for constructing 3-mile extension to present sewer system.

Lockport, Ill.—To Yale & Reagan, 208 S. La Salle St., Chicago, Ill., at \$59,951 for installation of sewer system. A. S. Calkins of Joliet, Ill., is engineer.

Fort Wayne, Ind.—For constructing 16,000 feet 12-inch, 5,630 feet 10-inch, 19,500 feet 8-inch sewers; also 43 manholes and 19 flush tanks to C. E. Hughes, Armory Bldg., Rockford, Ill.

Franklin, Ind.—By city council to Lee & Pedrick, for sewer work to cost \$6,500.

Boston, Mass.—For pipe sewers and drains in Marcella and Washington Sts., Roxbury, to M. De Sisto, at \$3,743.10. Other bids as follows: Marcello Construction Co., \$4,136.90; A. M. Cusack, \$4,424.95; Wm. L. Dolan, \$4,495.40; James J. Conway, \$4,579; Louis Balboni, \$4,858.16; Antony Cefalo, \$5,021.95; John F. Lynch, \$5,193.05; Martino De Matteo, \$5,384.08; John Landis, \$5,790.76; R. L. Barrett, \$6,312.50; also contract for pipe sewers and drains in Sheridan St. from Centre St. to point 900 ft. southeasterly, Roxbury, to Antony Cefalo, at \$2,825.40. Other bids were as follows: Anthony Baruffaldi, \$3,327.98; Timothy Coughlin, \$3,530.45; M. De Sisto, \$3,632.99; Geo. J. Regan, \$3,635.55; Wm. L. Dolan, \$3,712.80; James J. Conway, \$3,874; Marcello Construction Co., \$4,229.90; Louis Balboni, \$4,415.80; Martino De Matteo, \$5,808.55; John Landis, \$6,454.03.

Boston, Mass.—For constructing surface drains and catch-basins in Gainsborough and other streets, to John Landis, at \$5,404. Other bids were: McCarthy & Walsh, \$6,109; Antony Cefalo, \$6,398; Anthony Baruffaldi, \$6,493; Andrew M. Cusack, \$6,542; M. H. Kelley, \$6,556; John McCourt Co., \$6,660; Louis Balboni, \$6,887; William L. Dolan, \$6,956; James J. Conway, \$7,505; Caruso & Bruni, \$8,143; John F. Lynch, \$8,333; Louis W. Hickey, \$12,301.

Fall River, Mass.—To Hanscom Construction Co., Boston, at \$173,834, for Contract No. 1, for intercepting drain of reinforced concrete.

Fall River, Mass.—To Hanscom Constr. Co., Boston, Mass., at \$173,833.75, for contr. No. 1, for re-conc., intercepting drain and appurtenances. Barrows & Breed are engrs., 6 Beacon St., Boston.

Kansas City, Mo.—For constructing lateral sewers, to M. Walsh, 2915 E. 23d St., at \$103,800.

Rayenna, Neb.—To Arthur A. Dobson Co., Lincoln, for construction of sewer system.

New York, N. Y.—To Joseph L. Sigretto & Co., Richmond Hill, New York, N. Y., at \$6,793, for constructing sewer in Lefferts Ave.; \$1,005 for sewer in Flushing Ave. and \$4,029 for a sewer in Atlantic Ave.

Rochester, N. Y.—By Board of Contract and Supply contract for constructing sewer in Acorn and Pioneer Sts., to John Petrossi for \$1,024.20.

Syracuse, N. Y.—For constructing storm water sewers system in 1st and 2nd wards to C. T. Hookway Constr. Co., at about \$60,000.

Columbus, O.—See "Contracts awarded" Street and Roads.

Lorain, O.—To Randall & Cooper at \$7,091.50 for constructing lateral sanitary sewer in Elyria Ave., between Broadway and East 23d St.

Regina, Sask.—For 35,000 sq. ft. corrugated siding and roofing for filter bed at city sewage disposal works to Winnipeg Ceiling & Roofing Co., Winnipeg, Man.

Columbia, S. C.—By city, contracts totalling \$64,566.78 for material and construction of about 10 miles sewer and water mains; Hope Engineering & Supply Co., of Pittsburg, Pa., at \$28,405.75, for construction, and Lorick & Lowrance, of Columbia, at \$5,543.25, for sewer pipe.

Mitchell, S. D.—To Aiken Construction Co., Fargo, N. D., for lateral sewers at \$12,611. Other bidders as follows: Alamo Eng. Supply Co., Omaha, at \$15,858; Wm. B. Bosworth, Ada, Minn., \$12,613; Pioneer Bridge Co., Mitchell, S. D., \$15,550.

Dallas, Tex.—By City Commissioners, contract to Winslett-Eldridge Co., at \$11,941, for constructing sewer in Commerce St., between Houston & Texas Central Railroad right of way and Race St.

Salt Lake City, Utah.—On recommendation of Commissioner J. H. Wheeler, of committee on roads and bridges, County Commissioners have accepted bid of the Utah Concrete Pipe Co. of 20 cts. a ft. for 1,250 ft. of drain pipe to be laid on Redwood Road to eliminate a dangerous ditch. Pipe is to be purchased by county and will be laid by farmers free of cost to county.

Racine, Wis.—To E. R. Harding Co. of this city contract for constructing the 21st St. trunk sewer for \$86,822. Work consists of 3,522 ft. 66-in. brick at \$11.90; 1,778 ft. 60-in. brick at \$9.90; 578 ft. 54-in. brick at \$9.60; 1,353 ft. 36-in. brick at \$5.65; 624 ft. 30-in. brick at \$3.10; 327 ft. 27-in. brick at \$2.60; 328 ft. 18-in. pipe at \$1.50; 26 manholes at \$59 each; 33 catchbasins at \$40 each; outfall, \$8,100.

WATER SUPPLY.

Sacramento, Cal.—City Commission has adopted resolution authorizing City Attorney to enter into negotiations with Charles Gilman Hyde and G. H. Wilhelm to act as consulting engineers, and to suggest and advise city on plans and specifications for water mains for which \$2,361,600 bonds were voted recently.

San Diego, Cal.—Better water system is being discussed.

Wilmington, Del.—Water Board is asking for bond issue of \$350,000 for improvements to water system.

Hawkinsville, Ga.—Election will be held Feb. 17 to vote on bond issue, proceeds to be used for construction of water system. G. W. Jordan is Mayor.

Chicago Heights, Ill.—Proceedings for laying a water main on East Side are being made by board of local improvements.

Mishawaka, Ind.—Board of Works has decided to purchase at least 500 additional water meters before July 1. A. R. Kline is Supt.

Georgetown, Mass.—Citizens are petitioning for installation of water system.

Greenfield, Mass.—Installation of water meters is being discussed.

Chillicothe, Mo.—Election will be held to vote on \$135,000 bond issue for purchase of present water plant.

Billings, Mont.—A. B. McDonnell, of Kansas City firm of Burns & McDonnell, engineers for proposed new water system, will arrive in Billings shortly to explain plans to local contractors who are considering placing bids for the work. It is possible the city council will order the advertising for bids at next meeting.

Billings, Mont.—City council in all probability will authorize advertising and set date for receiving of bids for improvements in the city's water system. Bids will be received on four contracts. One of these will be for building of concrete settling basin and filter house. Another will be for furnishing and installation of filter equipment. Third will be for furnishing and installation of new pump and motor, and fourth will be for installation of extensions. Cost of whole will approximate \$125,000.

Asbury Park, N. J.—Bids will be asked for laying a 12-inch water main from

24-in. forcing main now being laid from city pumping station to standpipe at Second Ave., from Asbury Ave. north of Langford St. to Third Ave., there joining a 6-in. city main.

Long Branch, N. J.—Morris R. Sherred, city engineer of Newark, has begun survey of water pipe system in Long Branch with view to determining whether or not Tintern Manor Water Co., which owns system, is charging excess rates for its service and whether establishment of municipal plant would be advisable.

Ballston Spa, N. Y.—At charter election in March, taxpayers will be given opportunity to vote on proposition to expend \$10,000 for water meters to be placed in every residence in village.

Lyons, N. Y.—After several years of agitation upon question of municipal ownership, village of Lyons will assume ownership of present waterworks plant. The Municipal Board will in few days advertise two village bond issues aggregating \$188,000, for sale, one for \$97,000, proceeds to be used in extending water mains, putting in new and larger pipes where necessary and building filtering plant and new pumping station; the other for \$91,000, proceeds of which will be used in building complete system of sewerage and disposal plant. Work on both propositions will be started at earliest possible time this spring.

Rochester, N. Y.—City will construct about 20 miles of 36-inch c. i. pipe. Beekman C. Little is superintendent, water bureau; also about 8 miles 6 to 36-inch c. i. distribution system.

Yonkers, N. Y.—Requisitions have been received from water bureau for following things: Ten tons pure mine pig lead; 1,000 lengths of 8-in. pipe, and one 25-kilowatt direct-current generator. Bids for these have been ordered advertised for.

Asheville, N. C.—City will lay 6,000 feet of 10-inch water mains in College St. to intersect with water main for Grove Park section.

Norlina, N. C.—Election may be held to vote on question of issuing bonds for construction of water system.

Wilmington, N. C.—Councilman T. W. Wood and other members of City Council favor idea of bond issue for \$50,000 for purpose of making improvements and enlargements at city waterworks plant.

Red Rock, Okla.—At special election held on Jan. 28 water works bonds carried by small majority. Plans and specifications are being prepared by The Benham Engineering Co., consulting engineers, of Oklahoma City, Okla. Amount of work, \$22,000.

Yale, Okla.—Bids will be received Feb. 20 for purchase of \$25,000 bonds for water works extensions. Engineer is D. B. Merry, of Oklahoma City.

Union, S. C.—Election will be held Feb. 16 for voting on bond issue of \$25,000, proceeds to be used for extension of water and sewer systems.

Walterboro, S. C.—See "Lighting and Power."

Denison, Tex.—Following bids have been received for furnishing of 4,500 lin. ft. 6-in. cast iron pipe: United States Cast Iron, Pipe and Foundry Company of Austin, \$25.30 per ton; R. D. Wood & Company of Houston, Texas, \$24.40; American Cast Iron Pipe company of Dallas, \$24.90; Hardy Greenwood of Dallas, \$24.40.

Norfolk, Va.—Numerous estimates have been received and opened by Board of Control for brass pipe, brass couplings, brass globe valves, gaskets and cap screws requisitioned by water department and have been referred to Engineer Dornin for recommendation.

Bellaire, W. Va.—Bond issue of \$45,000 will be voted on Feb. 9 by residents of Shadyside for purpose of securing site for pumping station and installing waterworks system.

St. Marys, W. Va.—City will construct reservoir at cost of about \$8,000.

Janesville, Wis.—Within next few weeks city council will take steps necessary to make special bond issue to provide for funds to effect purchase of water works plant from Janesville Water Co. at price of \$265,000 fixed by state railroad commission. A special ordinance will be necessary for this purpose.

Janesville, Wis.—Resolution instructing City Attorney W. H. Dougherty to draw ordinance authorizing bond issue for sale of negotiable city bonds to amount of \$265,000 for purchase of waterworks, will be brought before council.

CONTRACTS AWARDED.

Sterling, Col.—To Hendrie & Bolthoff Co., Denver, at \$5,120, for supply of pipe and fittings for extensions to city water mains.

Denver, Colo.—For constructing 6-mile water conduit to connect with West Alameda Ave. and Federal boulevard water mains to Wm. O'Gara & Phillips Construction Company, at about \$300,000.

Key West, Fla.—To R. D. Wood & Co., Philadelphia, Pa., for furnishing 1,400 ft. 14-in., 1,200 ft. 12-in., 800 ft. 10-in. bell and spigot cast iron pipe for \$23 per ton and fittings at \$55 per ton.

Rock Island, Ill.—By City Council to P. F. Trenkenschuh, at about \$1,100, for 8-in. watermain on First Ave.

Michigan City, Ind.—For furnishing and laying water mains, 30-in. and 24-in., lowest bidder was Nelson Bros., Muskegon, Mich., at \$26,494.05.

Bordentown, N. J.—To Pugh & Hubbard, Philadelphia, Pa., at \$900 for laying of 10-in. flexible joint pipe in Crosswicks Creek.

East Orange, N. J.—For constructing addition to pumping station to Fred Kilgus, Inc., Sixth St., Newark, N. J., at \$8,100.

New York, N. Y.—To Victory Contracting Corporation, 1308 East 4th St., Brooklyn, at \$5,685, for furnishing, delivering and installing cast iron water pipe, hydrants, gates, etc., in Prospect Park.

Rochester, N. Y.—Contract for furnishing cast iron stop gates and jackets for water works department has been let to Enterprise Foundry Co. for \$3,290.50.

Winnier, S. D.—To Geo. Trittle, of Winnier, for tapping water mains and laying service pipe, at \$21.50 per tap.

Norfolk, Va.—The Porter-Moore Company has received contract for furnishing water department until May 1, next, necessary brass and galvanized fittings to be required in connection with installation of water meters throughout the city.

Seattle, Wash.—For construction of water mains on Third Ave. N. W. to Henry G. Niblett at \$1,433.

LIGHTING AND POWER

Pasadena, Cal.—Resolution of intention to order construction and installation of posts, conduit wires, lamps "and other suitable and necessary appliances" on South Lake Ave. from Colorado St. to Arden Rd. has been introduced at meeting of City Commission. Resolution also provides for installation of wires on Glenarm St., Galena Ave. and California St. in connection with the work. Eighty-one ornamental iron and copper lighting posts are to be furnished. The single-lamp system is to be adopted and light furnished will be 80 candlepower for each lamp.

Canon City, Colo.—The Arkansas Valley Ry., Lt. & Pwr. Co., of Canon City, is planning the installation of ornamental street lighting system or curb lighting system.

Washington, D. C.—A merchant in Russia informs American consul that he wishes to be placed in communication with manufacturers of steam turbines and steam engines. It is desired to purchase such engines, etc., as will permit use of back steam, under pressure, to be used for drying and boiling purposes. Correspondence may be in English. Bank reference is offered. No 15,485 Bureau of Manufactures.

Pablo Beach, Fla.—Up-to-date electric lighting plant will be installed.

Boise, Ida.—Cost of installing electric lighting system on South Side is estimated at \$4,639. City Council will ask for bids for material and installing same probably in the near future.

Indianapolis, Ind.—Board of public works has ordered Merchants Heat and Light Company, under its contract for street lighting which goes into effect April 15, to put in arc lights at Twenty-fifth St. and the Monon railroad tracks, and at Twenty-eighth St. and Kenwood Ave.

Imogene, Ia.—City Council is considering installation of municipal electric light plant. It is said that energy for same will be obtained from Shenandoah plant.

Schleswig, Ia.—City Council is said to have made appropriation of \$16,000 for construction of municipal electric light plant.

Great Bend, Kan.—Plans have been made for the proposed ornamental street lighting system for erection of 55 ornamental standards carrying incandescent lamps.

Ottawa, Kan.—The Franklyn Retailers' Association is considering plans for installation of ornamental street-lighting system on principal streets of city.

Peoria, Kan.—City Council will shortly award contract for installation of ornamental lighting system on Peoria St. Estimates have been submitted by Herbert Stockwell, city engineer, of cost of erecting ornamental lamps on South Pearl St. and South Silver St. and all streets for one block from public square.

Lawrenceburg, Ky.—Committee will secure funds for installation of ornamental street-lighting system in business district. D. L. Moore, Jr., is a member.

Pleasant Hill, Mo.—Installation of electric-lighting system is being considered.

Asbury Park, N. J.—Acting on recommendation of Light Chairman Jacob B. Sweet, Neptune Twp. committee has voted to adopt use of 100 candlepower incandescent lights in place of arc lights at several places in their district and to contract with Atlantic Coast Co. for more extended lighting system.

Newark, N. J.—Better lighting for Broad St., between Central and Belleville Aves., has been authorized by Board of Works.

Sentinel Butte, N. D.—Installation of electric-lighting system is said to be under consideration.

Cleveland, O.—The municipal lighting department is making plans to extend ornamental lighting system on Euclid Ave. to E. 22d St. Cost of system is estimated at \$200,000.

Hamilton, O.—Installation of cluster light system for Main St. is being planned.

Newark, O.—Municipal light plant is being considered.

Youngstown, O.—Bids for new street lighting system for Youngstown have been opened by H. C. Fox, secretary to Service Director Veeder Heasley. Two bids were received, one from Youngstown & Sharon Railway Co., holders of present street lighting franchise, and other from the Mahoning County Light company. Bids will be referred to lighting committee of council which will make recommendation. Indications are that contract will be awarded to the Youngstown & Sharon, however, and that work on the remodeling of Youngstown's street lighting system with "white way" lights on business streets and incandescent nitrogen tungsten lamps on residence streets, in place of old arc lights, will commence very soon.

Walterboro, S. C.—Bonds in sum of \$45,000 have been sold to the Palmetto National Bank of Columbia; \$15,000 of this amount will be used for installation of electric lights; \$18,000 for enlargement and extension of water works plant, and \$12,000 for installation of sewerage system.

Milwaukee, Wis.—F. G. Simmons, commissioner of public works, has received recommendation from F. A. Vaughn of firm of engineers who are making lighting survey for city. In his communication, Mr. Vaughn advocated installation of eight electric lights on Rogers and Beecher Sts. from 23d to 27th Aves., the lamps to be purchased by city and current to be supplied by street railway and light company.

Janesville, Wis.—Plans are being considered for installation of new street-lighting system in business district.

Niagara Falls, Ont., Can.—The electric light committee has decided to recommend to Council installation of incandescent lamps in some of poorly lighted streets at south end and center. Superintendent Foster of municipal plant urged adoption of incandescent lamps rather than arcs.

CONTRACTS AWARDED.

Long Beach, Cal.—For installation of ornamental street-lighting system on principal business streets to Woodill & Hulse El. Co., of Los Angeles. Plans provide for erection of 247 cast-iron standards carrying one 60-watt and four 20-watt tungsten lamps, to be maintained by underground wires. Total cost about \$25,415.

Los Angeles, Cal.—For lighting fixtures for new depot on Fifth St., to Meyburg Co., of Los Angeles, at about \$10,000.

Duluth, Minn.—The 6-cent lighting contract with Duluth-Edison Co. has been formally signed by officers of company and city officials. The contract, which was accepted at special election on Jan. 19, provides for electric lighting at 6 cts. per kilowatt hour and 700 arc lights for the city at \$55 each per year.

North Bend, Neb.—At special meeting of city council contract for constructing electric lighting plant and lines has been awarded to Herman Rennau & Co. of this place.

FIRE EQUIPMENT

Bessemer, Ala.—Chief Donaho of fire department has petitioned council to buy 1,000 feet of fire hose for city's use. Matter was referred to fire department committee and mayor with power to act.

Suffield, Conn.—Purchase of automobile chemical truck is being considered.

Pensacola, Fla.—Following bids have been received for 1,000 ft. of fire hose: United and Globe Rubber Companies, of Trenton, N. J., offered single jacket at 40 and double jacket at 60 cts. per ft. W. A. Ray Hardware Co., Pensacola, offered double Mastiff at 90 cts.; Beacon at 85 cts.; Ulysses at 75 cts. per ft. Eureka Fire Hose Manufacturing Co., Atlanta, Ga., offered Paragon at \$1.10; Red Cross at \$1, and Red, White and Blue at 90 cts. per ft. Fabrics Fire Hose Co., New York, offered Keystone at \$1.10; Safety at \$1; Horseshoe at \$1; Black Diamond at 90 cts.; Yale at 80 cts.; Elk Head at 70 cts. New Jersey Car Springs and Rubber Co., Jersey City, N. J., offered Double Jacket Cotton Fire Hose at 85 cts. a ft. Gutta Percha and Rubber Manufacturing Co., New York, offered Baker (multiple woven) at \$1.10; Ajax, \$1; Rescue, at 90 cts.

Kokomo, Ind.—Board of works has instructed city clerk to advertise for bids for new fire apparatus, to be received Feb. 15. Advertisement reads "One combination hose and motor pumping engine of not less than 650 gals. of water a minute; one large size city service hook and ladder and one fire chief's 6-cylinder motor runabout." Bids may be submitted singly or in a lump. Bonds covering purchase will be sold Feb. 11. They are for \$15,000.

Richmond, Ind.—Ordinance has been passed providing for purchase of automobile aerial ladder truck to cost about \$11,000.

Baltimore, Md.—Another step toward motorization of Baltimore Fire Department is being taken by Fire Board in purchase of nine tractors. Twenty-two companies then will have been completely motorized.

Amherst, Mass.—Town will vote an appropriation of \$3,000 for purchase of automobile fire truck.

Greenfield, Mass.—Sum of \$6,000 has been appropriated for purchase of second combination truck for use of fire department.

Greenfield, Mass.—Appropriation is asked for purchase of additional motor-driven apparatus.

Northfield, Mass.—Town of Northfield has voted to buy chemical fire engine and has appointed committee consisting of A. G. Moody, Dr. N. P. Wood and C. C. Stearns to take charge of the matter.

Decatur, Mich.—About 500 ft. of hose and a new patent nozzle will be purchased.

Duluth, Minn.—Commissioner Hicken, head of public safety department, will ask council at its regular weekly meeting for appropriation of \$8,500 for purchase of two more motor units for fire department during coming year. This amount is about \$10,000 less than that spent during 1914 for new equipment.

Meridian, Miss.—Mayor Packer has recommended purchase of another motor truck for fire department.

Manchester, N. H.—Motor apparatus to cost \$12,000 may be purchased shortly.

Lakewood, N. J.—Motor apparatus will be purchased shortly for Rescue Co. No. 2.

Long Branch, N. J.—New police and fire alarm systems have been recommended.

Long Branch, N. J.—Ordinance is being considered for repairs to fire alarm system and motorizing of apparatus in independent firehouse.

Metuchen, N. J.—Installing of fire alarm system is being discussed.

Morrisville, N. J.—Funds are being raised for purchase of new fire equipment.

Paterson, N. J.—Specifications have been completed for proposals for bids for two new wagons for fire department and they will be sent at once to manufacturers, so that they may submit their estimates, to be considered by Board of Fire and Police Commissioners at their meeting on Feb. 19.

Paulsboro, N. J.—In further effort to purchase automobile fire apparatus, committees from Paulsboro and Billingsport fire companies will meet a spe-

cial committee from Borough Council, when arrangements will be made to have borough appropriate \$500 annually to each company for five years.

Perth Amboy, N. J.—Board of Aldermen have practically decided to install pump on proposed new motor-drawn apparatus, which has been ordered for use by McClellan Engine Co.

Medina, N. Y.—Considerable agitation is going on in Medina relative to purchasing automobile fire truck to replace the horses now used by fire department.

Newburgh, N. Y.—Fire department committee of City Council will ask Council to call special election of taxpayers to vote on proposition to spend \$15,000 for three pieces of motor-driven apparatus for the department.

Schenectady, N. Y.—Commissioner of Safety Wemple and Fire Chief Yates are anxious to provide fire department with two new tractors, one to pull big truck at No. 2 station on lower State St. and other for gasoline engine at No. 9 station on Brandywine Ave. With this in view, Chief Yates has had blueprints of proposed tractors made and copies will be sent to factories for estimation on the cost.

White Plains, N. Y.—Bill has been introduced in State Senate to legalize \$6,000 issue for fire department purposes.

Yonkers, N. Y.—A requisition has been received from the Department of Public Safety, asking that bids be asked on 3,000 ft. of fire hose, bids to be substituted for those received in recent similar contest. Specifications on which these bids will be received will be more rigorous than in former case.

Columbus, O.—Bonds in sum of \$60,000 may be issued to provide for purchase of auto equipment.

Eaton, O.—At meeting of city council ordinance was passed providing for appropriation of \$5,000, with which to make purchase of motor fire truck. Matter has been under consideration for a long time, but it is now planned to have truck installed at early date.

Girard, O.—Clerk Sanford of Girard Village Council has been instructed to advertise for bids for new auto fire truck which will be installed when fire department building is completed.

Hamilton, O.—New fire alarm system is urged.

Newark, O.—Seasongood, Mayer & Co., Cincinnati bond buyers, have been awarded the \$12,000 bond issue for purchasing motor equipment for fire and police departments, bids for which were opened by City Auditor Dodd. Seasongood, Mayer & Co. bid a premium of \$132, and accrued interest.

Youngstown, O.—See "Streets and Roads."

Easton, Pa.—Easton's Council has decided to issue \$100,000 of bonds to complete motorization of fire department and for parks and playground improvements.

Harrisburg, Pa.—Ordinances calling for purchase of two combination chemical and hose trucks and three tractors for use in fire department and truck for highway department have been passed. Fire apparatus is to cost \$18,000 and the truck \$2,500.

Lebanon, Pa.—The Independent District Fire Co. will purchase modernly equipped auto fire engine.

Royersford, Pa.—Royersford Council will purchase 1,000 ft. of hose for town's two fire companies.

Pittsburgh, Pa.—Councilmanic Committee on Public Safety has affirmed ordinance for contract for motor-propelled combination hose and chemical wagon at price not to exceed \$3,500. It is desired by Department of Public Safety to take advantage of offer made by Hilland Automobile Company to sell to city a piece of apparatus for \$3,500. The wagon was made for Uniontown fire department and was to have cost Uniontown \$5,600.

Waynesboro, Pa.—Question of motor engine and truck equipment is being discussed.

Woonsocket, R. I.—City Council committee on fire department will recommend purchase of combination chemical and hose wagon at cost of approximately \$3,900.

Richmond, Va.—Board of Public Wks., following action of ordinance committee of Council in endorsing negotiating of temporary loan on part of city to purchase an automobile aerial ladder truck and to make alterations at city building, has decided to recommend to Council to authorize loan of \$12,500, to be borrowed from time to time.

Worwood, W. Va.—Purchase of new fire truck is being discussed.